

**HEALTH AND SAFETY PLAN  
PRE-REMEDIAL SITE ASSESSMENT ACTIVITIES  
NEW YORK CITY SMELTER SITES  
NEW YORK, NEW YORK**

Prepared for:

**U.S. Environmental Protection Agency**  
New York, New York 10007

Prepared By:

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## APPENDICES

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## SECTION 1 - APPROVALS

Prepared By: Michele Capriglione  
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Associate Project Scientist

Date 10/13/14

Approved By: \_\_\_\_\_  
Alanna Garrison, CSP, CHMM  
Health and Safety Officer

Date \_\_\_\_\_

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

NAME	SIGNATURE	AFFILIATION	DATE
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Scott Snyder		Weston Solutions Inc.	
Michele Capriglione	<i>MC</i>	Weston Solutions Inc.	<u>10/13/14</u>
TBD		Weston Solutions Inc.	
<i>John Pellicano</i>	<i>John Pellicano</i>	<i>Weston Solutions</i>	<u>10/14/14</u>
<i>Scott Cassidy</i>	<i>Scott Cassidy</i>	<i>Weston Solutions</i>	<u>10/14/14</u>
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<i>Pietro Di Tillio</i>	<i>Pietro Di Tillio</i>	<i>Weston Solutions</i>	<u>11/5/14</u>

## **SECTION 2 - GENERAL**

### **2.0 INTRODUCTION**

This section of the Site Health and Safety Plan (HASP) document defines general applicability and general responsibilities with respect to compliance with Health and Safety programs for the sampling field activities to be conducted as part of the New York City smelter sites [New York Solder Co. (NYS), Kornblum, Sidney Metals Co (KS), Pittsburgh White Metal (PWM), and Columbia Smelting & Refining Works (CSR)] Preliminary Assessments/Site Inspections (PA/SIs). Due to the similarity in their respective scopes of work and their geographic proximity, all four New York City smelter site PA/SI investigations will be covered under this one HASP.

The purpose of this HASP is to define the requirements and designate protocols to be followed at every site during investigation activities. Applicability extends to all Government employees, contractors, subcontractors and visitors.

All personnel on site, contractors and subcontractors included, shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This HASP summarizes those hazards and defines protective measures planned for the site.

This plan must be reviewed and an agreement to comply with the requirements must be signed by all personnel prior to entering the exclusion zone or contamination reduction zone.

During development of this plan, consideration was given to current safety standards as defined by U.S. Environmental Protection Agency (EPA)/Occupational Safety and Health Administration (OSHA)/National Institute for Occupational Safety and Health (NIOSH), health effects and standards for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. Specifically, the following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311
- U.S. EPA, OERR ERT Standard Operating Safety Guides
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values

All visitors entering the contamination reduction zone and exclusion zone at the site will be required to read and verify compliance with the provisions of this HASP. In addition, visitors will be expected to comply with relevant OSHA requirements such as medical monitoring, training and respiratory protection (if applicable). Visitors will also be expected to provide their own protective equipment.

In the event that a visitor does not adhere to the provisions of the HASP, he/she will be requested to leave the work area. All non-conformance incidents will be recorded in the site logbook.

## **2.1 PROPOSED SITE ACTIVITIES**

WESTON will conduct surface (0 to 24 inches) soil sampling using dedicated plastic scoops and decontaminated stainless-steel bucket augers, and will perform air monitoring for particulates. The contaminant of concern is lead; the sampling objective is to determine if there have been historic releases of lead from the subject sites (former lead smelting facilities) to on-site soils and surrounding properties.

Additional activities will include photo documentation and recording of site features using Global Positioning System (GPS) technology. Air monitoring will be performed using personal Data RAM™ PDR-1000 dust monitors.

## **2.2 EMERGENCY TELEPHONE NUMBERS:**

24-Hour National Response Center	1-800-424-8802
24-Hour CHEMTREC	1-800-424-9300
24-Hour Agency on Toxic Substances & Disease Registry	1-770-488-7100
24-Hour WESTON Medical Emergency Service	1-800-455-6155
TSCA Hotline	202-554-1404 (Weekdays)
Bureau of Alcohol, Tobacco & Firearms (Explosives)	1-800- 800-3855 (Weekdays)
National Pesticide Information Center	1-800-858-7378 (7 Days)
Superfund/RCRA Hotline	1-800-424-9346 (Weekdays)
CMA Chemical Referral Center	1-800- 262-8200
National Poison Control Center	1-800-222-1222
U.S. DOT	202-366-4000 (Day) 202- 426-2075 (Hotline)
NIOSH - Health Hazard Evaluation	513-841-4382 (Weekdays)
OSHA - Health Response Team	801-321-6742 (Weekdays)

## 2.3 WESTON CONTACTS:

WESTON Program Manager

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Edison, NJ 08837  
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WESTON PC EHS Manager

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Corporate Health and Safety Director James Davis

251-434-6420 (W)

Site Health and Safety Officer

Scott T. Snyder, CHMM  
(732) 417-5828 (W)  
(973) 219-7394 (Cell)

WESTON's Medical Director

Dr. Peter Greaney  
(800) 455-6155

### **9:00 am to 7:30 pm Eastern Time**

Call: 800-455-6155 - Dial 0 or extension 475, Heather Lind to request the on-call clinician.

### **7:31 pm to 8:59 am Eastern Time, all day Saturday, Sunday and Holidays**

Call: 800-455-6155 Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes

## **SECTION 3 - HEALTH AND SAFETY PERSONNEL**

### **3.0 HEALTH AND SAFETY PERSONNEL RESPONSIBILITIES**

The Project Manager (PM), the Program Manager, and the site Health and Safety Officer (HSO), and all WESTON representatives share responsibilities for formulating and enforcing health and safety requirements and implementing the HASP.

#### **3.1 WESTON PROJECT MANAGER**

The PM has the overall responsibility for the projects and to assure that the goals of the site assessment projects are attained in a manner consistent with the HASP requirements. The PM will coordinate with the designated Site HSO and the WESTON contract HSO to assure that the goals of the Preliminary Assessment/Site Inspection (PA/SI), or other site activity are completed in a manner consistent with the HASP.

#### **3.2 WESTON CORPORATE ENVIRONMENTAL HEALTH AND SAFETY MANAGER (CEHSM)**

WESTON's CEHS Manager is responsible for establishing health and safety policies and procedures, and for the overall administration of the corporation's environmental health and safety program.

#### **3.3 WESTON PC EHS MANAGER / HEALTH AND SAFETY OFFICER (HSO)**

The PCEHS Manager / HSO shall be responsible for overseeing development of the HASP and shall ensure that the HASP complies with all federal, state and local health and safety requirements. The PC EHS Manager provides technical and administrative support for the WESTON Health and Safety Program.

#### **3.4 DESIGNATED SITE HSO**

The designated site HSO has total responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, it is vital that personnel assigned as HSO be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

## **SECTION 4 - SITE HISTORY AND PHYSICAL DESCRIPTION**

### **4.0 LOCATION**

The New York City smelter sites are situated throughout New York, New York. Site Location Maps for each site are presented at the end of Section 4.1.

### **4.1 DESCRIPTIONS**

The sites covered under this HASP were included in a list of hundreds of locations nationwide where secondary lead smelting or alloying might have been conducted between 1931 and 1964. The list was originally compiled by William P. Eckel in a doctoral dissertation for George Mason University and was based on entries in historical trade publications. The research was summarized in the article “Discovering Unrecognized Lead-Smelting Sites by Historical Methods” (Eckel et al., 2001), which was published in the American Journal of Public Health.

New York Solder Co., 684 E. 133rd Street, Bronx, NY 10454

The operational history of the New York Solder Co. as a smelter is substantially documented. According to available records, New York Solder Co. incorporated in January 1930. Available Sanborn maps indicate that the facility at 684–686 East 133rd Street had been constructed by 1935, yet stood vacant at that time. A “bottle printing” company occupied the facility in 1946–1947, after which the facility is labeled as “N.Y. Solder Co. Inc. solder mfg” on all Sanborn maps from 1951 through 2007 (i.e., the most recent map). The Sanborn maps indicate that the building covers the entire property. The building, including a billboard on the roof, is also visible in aerial photographs dated from 1941 to 2011. The Sanborn maps and aerial photographs show the presence of four residential properties with yard areas adjacent to the back wall of the facility, and several additional residential properties with yard areas across the street to the northeast. According to the City Directory Abstract for the subject address, NY Solder Co. Inc. was listed in city directories dated 2000 and 2005, and Precise Alloys Corp. was also listed at the address in 2000. The subject address was not listed in city directories prior to 2000, and NY Solder Co. Inc. was not listed for any adjoining property addresses at any time.

The subject property is not known to be listed in any environmental databases. However, the Occupational Safety and Health Administration (OSHA) investigated the New York Solder Co., Inc. facility from March to September 2002, identifying the company as a manufacturer of solder wire and bar solder from lead-based alloys. OSHA cited and fined the company for numerous violations of federal safety and health standards for exposure to lead. The violations listed above are considered to be evidence that New York Solder Co., Inc. was operating as a smelter at the facility until at least September 2002. According to available records, the company continued to submit biannual reports to the State of New York until 2008, and proclaimed dissolution in October 2009.

On November 13, 2012, and August 14, 2014, EPA visited 684 East 133rd Street in the Bronx, NY, the address of New York Solder Co. as indicated in Eckel’s report, Sanborn maps, and city directories. The site is located east of the northern terminus of the Robert F Kennedy Bridge

(formerly known as the Triborough Bridge). The reconnaissance confirmed that the building covers the entire subject property to the edges of the sidewalk. Currently the site is being used as a Twins Electric supply warehouse. There is no exposed soil on site. It is unclear from the available Sanborn maps and aerial photographs if the building has or had chimneys or smokestacks, although small roof features resembling chimneys were observed during the reconnaissance in 2012. Adjacent to the southwest side of the former facility are four residential properties; exposed soil was observed at the residence located at 685 E. 132nd Street and possibly at other residential properties located on E. 132nd Street. Historical and current aerial photographs show other occurrences of exposed soil adjacent to and across the street from the subject building. There are numerous residences on both sides of East 133rd Street. Playground One Thirty Four is located approximately 0.09 mile northwest of the subject property and has exposed soil. Exposed soil is located within the ROWs located on the on-ramp for Bruckner Boulevard at E. 133rd Street. Additional exposed soil is located on the Bronx Sanitation District office property located approximately 0.05–0.08 mile south from the site.

Kornblum, Sidney, 394 Johnson Avenue, Brooklyn, NY 11206

The operational history of Kornblum, Sidney (a.k.a. Crescent Smelting Works, Kornblum Sidney Metals) as a smelter is documented. The 1940 city directory lists “Crescent Smelting Works” as the occupant. Crescent Smelting Works is listed in the aforementioned doctoral dissertation; it is located 0.3 mile from Kornblum, Sidney and is being investigated separately by EPA. Sanborn maps, city directories, and certificates of occupancy from 1944 through 1951 indicate that a lead melting and/or smelting facility including Kornblum, Sidney operated at 394 Johnson Avenue in Brooklyn, NY.

The city directories reviewed list “Kornblum Sidney Metals” in 1945 and 1949. The 1951 Sanborn map indicates “lead melting” at the subject property. The 1951 Sanborn map also depicts apartments located on Ingraham Avenue, with backyards adjacent to the southern portion of the subject property. In addition, residential properties and apartments are depicted along Morgan Avenue to the east of the subject property. The 1954 aerial photograph suggests the presence of trees in the backyards of the apartments along Ingraham Avenue. Contrary to the Sanborn maps reviewed, which indicate a “tin smith” present at the subject property for the years 1965 through 2007, the city directories reviewed indicate commercial businesses (i.e., Guaranteed Roofing & Sheet Metal Co. Inc., J & J Bakery Distributors, and 3 & 3 Bakery Distributors) present from 1965 through 2005. The EDR Radius Map™ Report with GeoCheck® reviewed lists Kornblum, Sidney as a lead smelter; however, it appears that this listing is associated with the William P. Eckel doctoral dissertation.

On April 8 and August 14, 2014, WESTON and EPA personnel visited 394 Johnson Avenue, Brooklyn, NY, the address of the former Kornblum, Sidney facility as indicated in Eckel’s report, city directories, certificate of occupancy, and on the reviewed Sanborn maps. A concrete building was observed with no exposed soil at the subject property. There are backyards with exposed soil and trees at the apartment buildings immediately south of the subject property, as confirmed on current and historical aerial photographs. The nearest area of exposed soil surrounding a street-side tree was observed across the street from the subject property on Johnson Avenue along with other trees located on Morgan Street, Bogart Street, and Meserole Street. Gilbert Ramirez Park is located approximately 0.07–0.1 mile southwest of the site and has exposed soil. Satellite imagery available on GoogleMaps® shows other occurrences of exposed soil within 200 feet of the subject property

(e.g., residential properties along Morgan Avenue, southeast of the subject property). There are limited instances of exposed soil on or within the vicinity of the subject property; however, they do exist and were likely present during the historical smelting operations.

#### Pittsburgh White Metal, 284 Hamilton Avenue, Brooklyn, NY 11231

The operational history of Pittsburgh White Metal as a smelter is documented. Available Sanborn maps and city directories indicate that Pittsburgh White Metal operated from 1934 through 1950 at the corner of Hamilton and Huntington Avenues. The city directories reviewed for the subject property indicate “Pittsburgh White Metal Co.” at 284 Hamilton Avenue from 1934 through 1949; the 1934 listing includes: “type metal printers supplies.” The 1938 Sanborn map indicates “Pittsburgh White Metal Co. Inc.” at the corner of Hamilton and Huntington Avenues; this map shows three “auto controlled gas furnaces” in the southwestern portion of the facility and an office area in the eastern portion of the facility along Hamilton Avenue. Also visible on the 1938 Sanborn map are residential properties located to the south along West 9th Street and to the west along Henry Street. The 1950 Sanborn map indicates a white metal foundry at the subject property, although the building footprint had been reduced due to the addition of the Gowanus Parkway and westward shift of Hamilton Avenue; the aforementioned residential properties were still present. For the remaining years that Sanborn map coverage was reviewed (1969 through 2007), the sporadic presence of “Chem Labs” is noted at the corner of Hamilton and Huntington Avenues.

On April 8 and August 14, 2014, WESTON and EPA personnel visited 284 Hamilton Avenue in Brooklyn, NY, being the address of the former Pittsburgh White Metal facility as indicated in Eckel’s report, in city directories, and on reviewed Sanborn maps. An iron fence surrounds the 284 Hamilton Avenue parcel. No exposed soil was observed along Hamilton or Huntington Avenues on or in the immediate vicinity of the subject property. Adjacent to the south and west side of the subject property, residential properties were observed along West 9th Street and Henry Street. Although personnel were unable to observe the exposed soil in backyards of these residences during the reconnaissance, satellite imagery available on GoogleMaps confirms the likely presence of soil. A vacant lot with exposed soil, historically having had residential dwellings, is located directly south of the site. In addition, exposed soil was observed on the south side of West 9th Street in front of a former day care facility and along the pedestrian paths of the New York City Housing Authority (NYCHA) Red Hook East housing development. Further south of the site is the NYCHA Red Hook East housing development with exposed soil and numerous non-permeable surface playgrounds. There are several residences with limited instances of exposed soil in the vicinity of the subject property. Exposed soil located within the ROW street trees along Nelson Street, West 9th Street, and Mill Street was observed.

#### Columbia Smelting & Refining Works, 98 Lorraine Street, Brooklyn, NY 11231

The operational history of the Columbia Smelting & Refining Works (Columbia Smelting) as a smelter is documented. A 1931 advertisement for Columbia Smelting & Refining Works, Inc., 98-106 Lorraine St., indicated that the company manufactured soft lead, antimonial lead, Babbitts, solder, and several other metal products. The advertisement also listed items consumed by the company, including cable lead, battery plates, and soft lead. The 1938 Sanborn map indicates the

presence of “Columbia Smelting & Refining Works Inc., refinery & furnaces” at the subject property. The 1938 Sanborn map also depicts the Red Hook Houses federal housing development, “built 1938”, located across Lorraine Street and north of the subject property. Red Hook Houses is the largest public housing development in Brooklyn, covering a large area from west-northwest to east-northeast of the subject property. The next available Sanborn map (1950) shows that the buildings on the subject property had been demolished and the property had been incorporated into a playground, which extends from Lorraine Street to Bay Street and Hicks Street to Henry Street and covers over that section of Creamer Street. The subject property is shown as vacant on available historical aerial photographs dated 1924 and 1940, which pre- and post-date the documented years of operation (i.e., 1931–1938). The 1943 aerial photograph depicts four baseball fields (still present today) at the aforementioned playground area; the footprint of the former smelter is located within the baseball field located at the corner of Hicks and Lorraine Streets. Based on a review of aerial photographs, it appears that the subject property and the remainder of the block where it's located have been utilized as baseball fields since the early 1940s.

On February 28, March 15, and March 20, 2012, the City of New York Department of Parks and Recreation (NYC DPR) collected soil samples from the baseball fields and surrounding grassy areas. Soil samples collected on February 28 and March 15, 2012 were analyzed for lead only; sample results indicated the presence of lead ranging between 119 milligrams per kilogram (mg/kg) and 2,630 mg/kg. Between February 28 and March 15, 2012, NYC DPR added 1 inch of soil to each infield area. The March 20th soil sample was analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), and total metals (including mercury). There were no detections of VOCs or PCBs. There were several detections of SVOCs, primarily polyaromatic hydrocarbons (PAH). Analytical results of lead and mercury were 812 mg/kg and 0.63 mg/kg, respectively. The baseball fields were subsequently closed for 6-8 weeks for remediation by DPR.

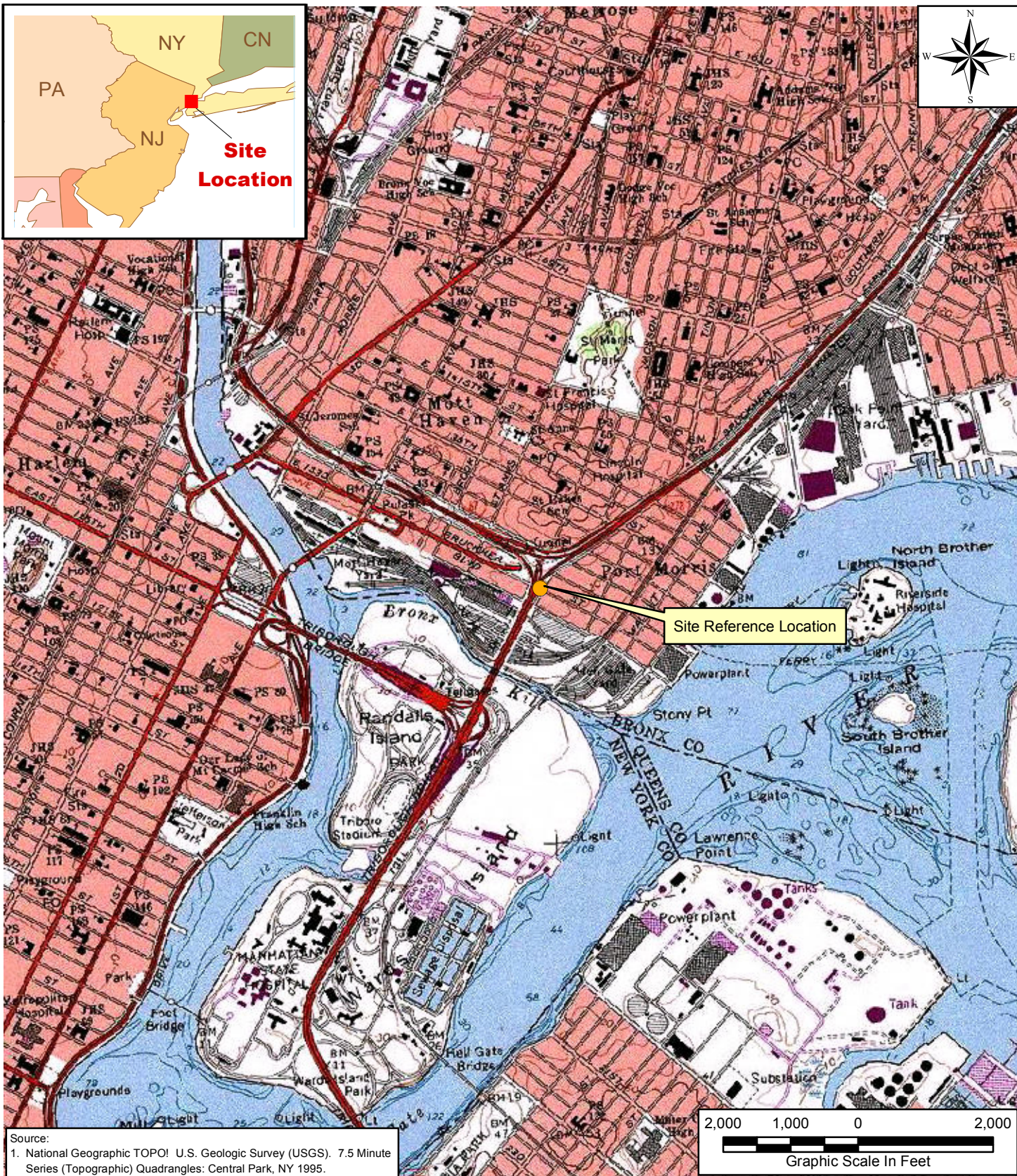
On April 8 and August 14, 2014, WESTON and EPA personnel visited 98 Lorraine Street in Brooklyn, NY, being the address of the former Columbia Smelting & Refining Works facility as indicated in Eckel’s report and on reviewed Sanborn maps. A baseball field (one of four baseball fields located on the aforementioned playground area) was observed on the former location of the subject property. During the August 2014 reconnaissance performed by WESTON, the baseball fields were not closed off to the public and children and adults were seen on the baseball park property. There is currently exposed historical soil nearby in all directions from the former location of the Columbia Smelting facility; however, some of these areas are limited to street trees in ROWs, particularly to the west. An expansive apartment complex with exposed historical soil and a playground, NYCHA’s Red Hook East, is located directly north of the site; the apartment complex and playground may have been present for approximately 2 years (possibly 1938-1939) while Columbia Smelting was in operation. Historical exposed soil was observed south of the site within Red Hook Park and along rights-of-way on Hicks Street, Henry Street, and Bay Street, where street-side trees are currently located.

## **4.2 REGULATORY HISTORY**

Environmental regulatory data bases were searched for these sites and with the exception of NYS, no

pertinent information regarding the regulatory history of these facilities is known to exist. The Occupational Safety and Health Administration (OSHA) investigated the NYS facility from March to September 2002, identifying the company as a manufacturer of solder wire and bar solder from lead-based alloys. OSHA cited and fined the company for numerous violations of federal safety and health standards for exposure to lead.

**SITE LOCATION MAP**  
**NEW YORK SOLDER CO.**



Source:  
1. National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Central Park, NY 1995.

LEGEND:

● Site Reference Location

PROJECT:

New York Solder Co.

CLIENT NAME:

EPA

TITLE:

Site Location Map  
New York Solder Co.  
684, 690 E. 133rd Street, Bronx, NY



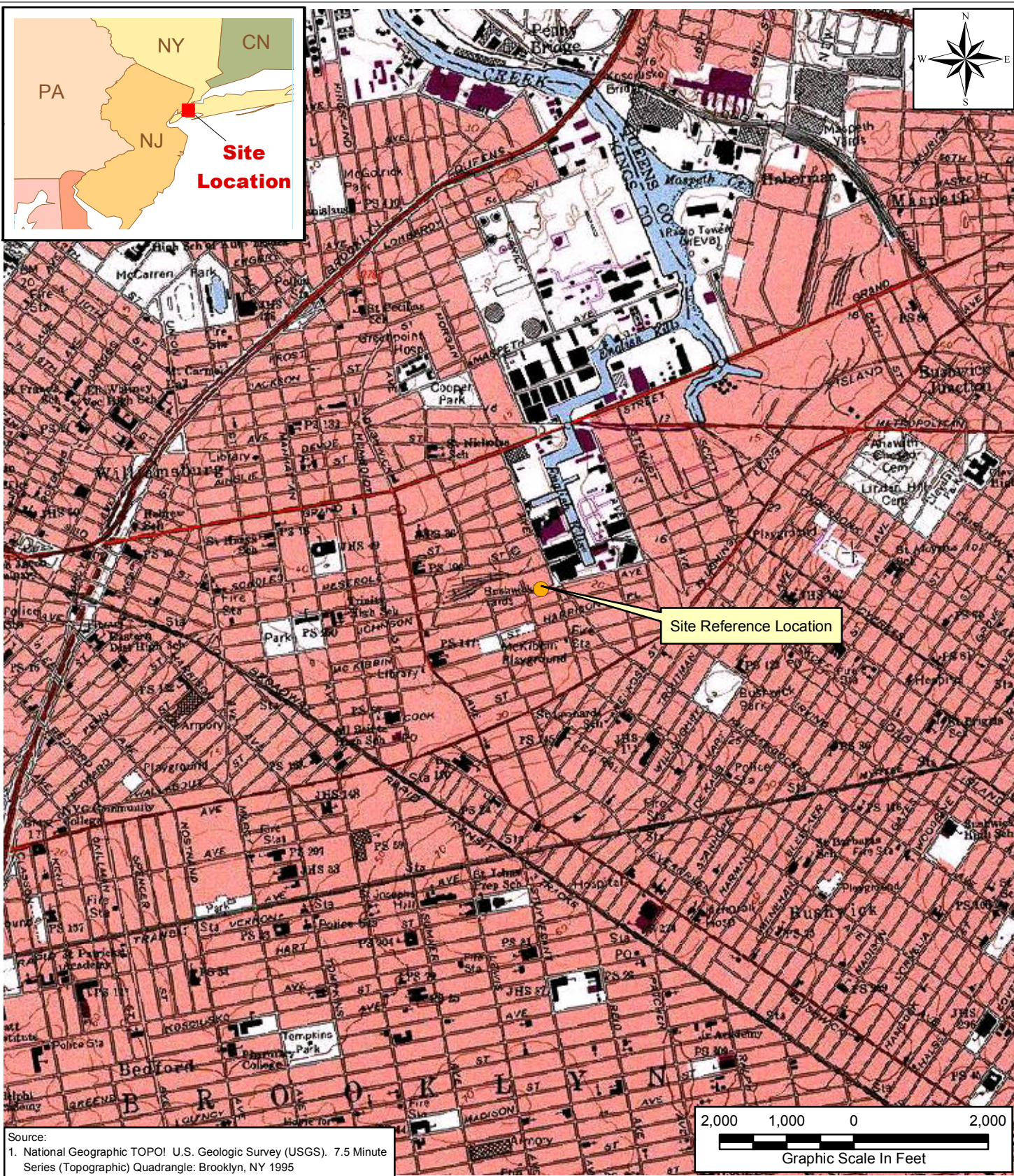
DATE:

January 2015

FIGURE #:

1

**SITE LOCATION MAP**  
**KORNBLUM, SIDNEY METALS CO**



Source:  
1. National Geographic TOPOI U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangle: Brooklyn, NY 1995

LEGEND:

● Site Reference Location

PROJECT:

Kornblum, Sidney

CLIENT NAME:

EPA

TITLE:

Site Location Map  
Kornblum, Sidney  
394 Johnson Avenue, Brooklyn, NY



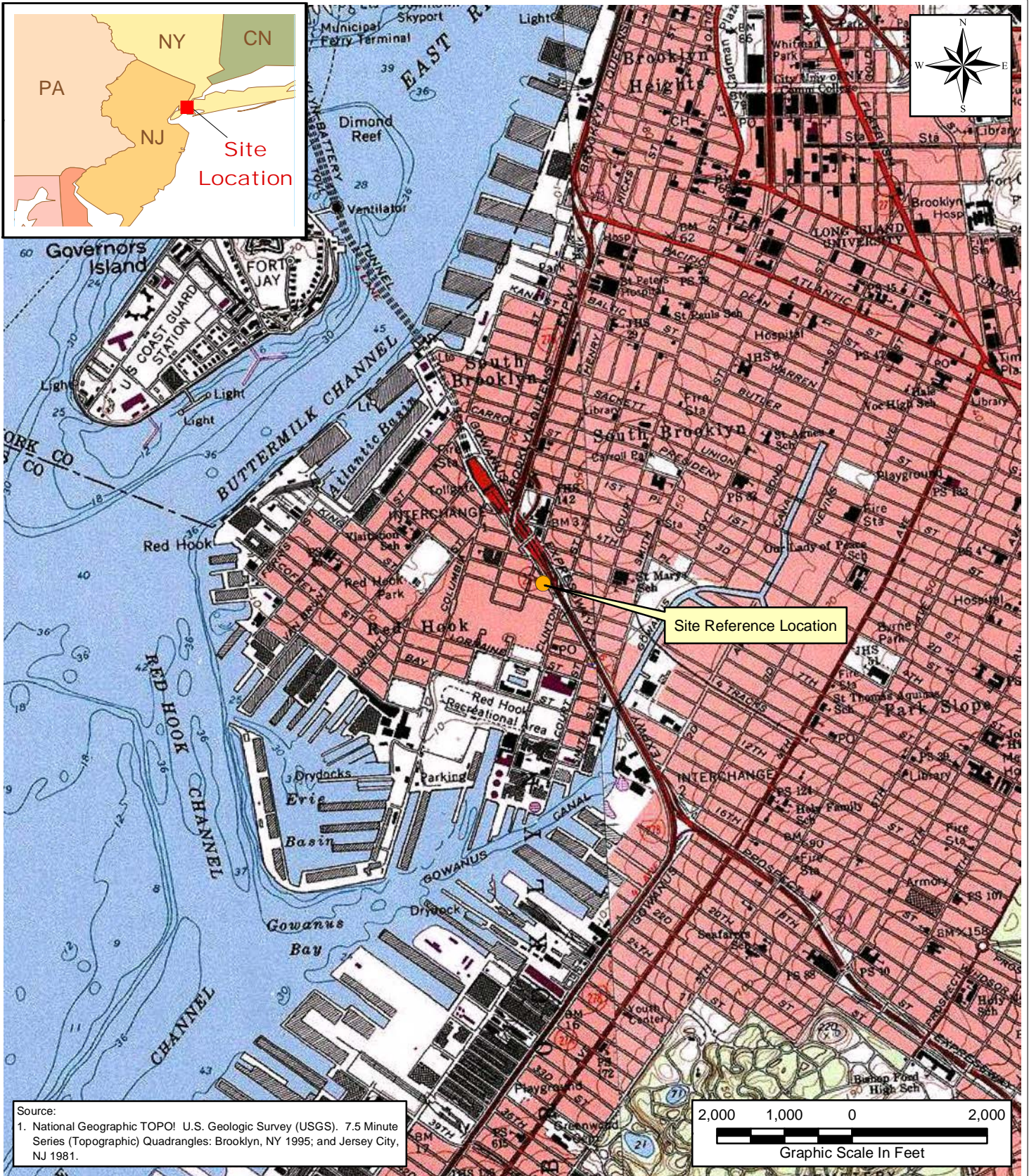
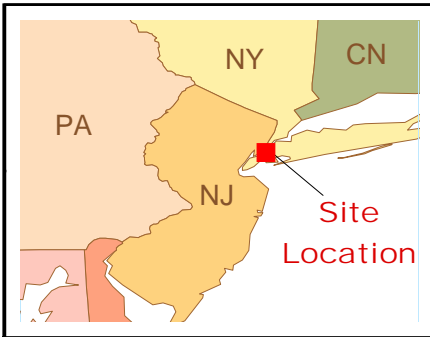
DATE:

January 2015

FIGURE #:

1

**SITE LOCATION MAP**  
**PITTSBURGH WHITE METAL**



Source:  
1. National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Brooklyn, NY 1995; and Jersey City, NJ 1981.

LEGEND:

● Site Reference Location

PROJECT:

Pittsburgh White Metal

CLIENT NAME:

EPA

TITLE:

Site Location Map  
Pittsburgh White Metal  
284 Hamilton Avenue, Brooklyn, NY



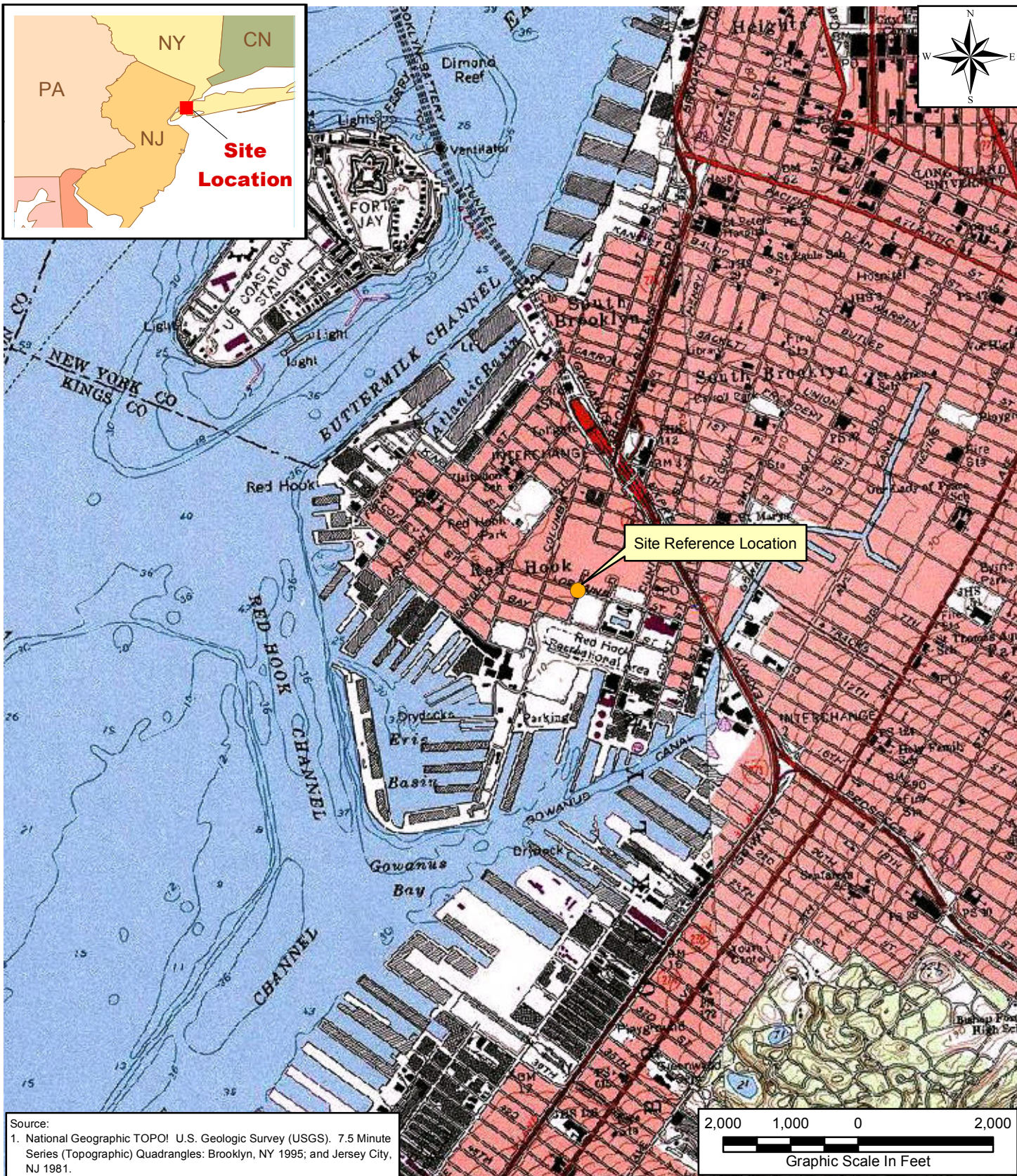
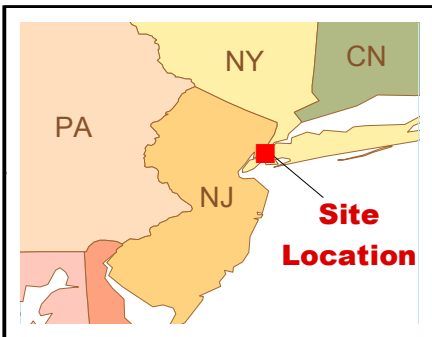
DATE:

May 2015

FIGURE #:

1

**SITE LOCATION MAP**  
**COLUMBIA SMELTING & REFINING WORKS**



Source:  
1. National Geographic TOPO! U.S. Geologic Survey (USGS). 7.5 Minute Series (Topographic) Quadrangles: Brooklyn, NY 1995; and Jersey City, NJ 1981.

LEGEND:

● Site Reference Location

PROJECT:

Columbia Smelting & Refining Works

CLIENT NAME:

EPA

TITLE:

Site Location Map  
Columbia Smelting & Refining Works  
98 Lorraine Street, Brooklyn, NY



DATE:

October 2014

FIGURE #:

1

## **SECTION 5 - SITE-RELATED INCIDENTS, COMPLAINTS, AND ACTIONS**

### **5.0 GENERAL**

Environmental regulatory data bases were searched for these sites in order to compile any site related incidents, complaints and actions associated with these facilities; with the exception of NYS, no pertinent information is known to exist. The Occupational Safety and Health Administration (OSHA) investigated the NYS facility from March to September 2002, identifying the company as a manufacturer of solder wire and bar solder from lead-based alloys. OSHA cited and fined the company for numerous violations of federal safety and health standards for exposure to lead.

## SECTION 6 - CHEMICAL CONTAMINANTS DATA

### 6.0 INTRODUCTION

This section outlines the potential chemical hazards which workers may be exposed to during work on these projects. This is a representative list of known and suspected hazardous substances at this site. Other chemicals may be present at the site but have not yet been identified. Unless a material is identified by a valid label, it shall be considered as unknown, and handled as such.

### 6.1 CHEMICAL DATA INFORMATION

Contaminant/ Source (conc.)	PEL/TLV/IDLH Routes of Exposure	Symptoms of Exposure	First Aid Procedures
Lead	OSHA PEL – 0.050 mg/m <sup>3</sup> NIOSH REL – 0.050 mg/m <sup>3</sup> IDLH – 100 mg/m <sup>3</sup> Routes of Exposure - inhalation, ingestion, skin and/or eye contact ACGIH TLV - 0.050 mg/m <sup>3</sup>	Abdominal pain, nausea, and vomiting. The substance may have effects on the blood, bone marrow, central nervous system, peripheral nervous system, and kidneys, resulting in anemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development. This substance is probably carcinogenic to humans.	Eye: Irrigate immediately Skin: Remove contaminated clothes, soap wash promptly Breathing: Respiratory support Swallow: Rinse mouth, give water, SEEK MEDICAL ATTENTION.

## **6.2 CHARACTERISTICS**

Identify and attach Safety Data Sheets (SDSs) in Appendix A for all known or suspected chemical hazards. Appendix B includes SDSs for chemicals utilized in conducting site assessment sampling activities, such as preservatives and decontamination fluids.

## **6.3 SOURCE OF CONTAMINATION**

The source currently being evaluated is contaminated soil.

## SECTION 7 - HAZARD ASSESSMENT

### 7.0 GENERAL

This HASP defines the hazards and methods (engineering and administrative controls as well as personal protective equipment) to protect personnel from those hazards identified in the background information. The evaluation of hazards is based upon the knowledge of site background information and anticipated risks posed by the specific operation.

The following subsections describe each task/operation in terms of the specific associated hazards. In addition, the protective measures to be implemented during completion of those operations are also identified.

### 7.1 TASK-SPECIFIC RISK ANALYSIS

#### Soil Sampling and Sample Preservation

WESTON will conduct soil using dedicated plastic scoops and decontaminated stainless-steel augers. Rinsate blanks will be preserved with nitric acid to a pH of less than 2. Other activities will include photo documentation and recording of site features using GPS technology.

Sampling Hazard	Engineering Control	Administrative Control	Personal Protective Equipment	Weston FLD #
<b>PHYSICAL</b>				
Slip/trip/fall	Field mark / Cordon off areas with debris or other hazards	Self-awareness; Use buddy system	Safety boots	Various
Cold Stress	Limit exposure to elements	Schedule rest breaks accordingly to prevent overexposure to elements; Use buddy system to monitor	Heavy clothing / layer clothing	06
Heat Stress	Limit exposure to elements through use of tent or shielding, use of sunscreen	Schedule rest breaks accordingly to prevent overexposure to elements; Use buddy system to monitor	Light clothing	05

Sampling Hazard	Engineering Control	Administrative Control	Personal Protective Equipment	Weston FLD #
<b>PHYSICAL (continued)</b>				
Utilities	N/A	Ensure utilities are marked out in field prior to beginning intrusive work; complete FLD34 checklist	N/A	34
Vehicle hazards	Cordon off work area is possible exposure to vehicular traffic	Awareness of worker location in reference to roadways and on-site vehicles; Use buddy system	High-visibility safety vest	20
Rough terrain	Cordon off / field mark hazards	Use buddy system	Safety boots	11
Manual lifting (sample coolers)	N/A	Identify potential contact hazards, identify slip/trip/fall hazards, proper lifting technique	Work gloves	10
Hand tools (bucket auger)	N/A	Inspect auger prior to use, awareness that excess pressure, repetitive motion, and awkward positions increase the risk of musculoskeletal injury, work/rest schedule, alternate augering responsibilities	Work gloves	38
Inclement weather	Limit exposure to elements through use of tent or shielding	Schedule rest breaks accordingly to prevent overexposure to elements	Overboots; rain gear	02
Site security	N/A	Use buddy system at all times; Use Site Security Checklist (see App. J)	N/A	N/A

<b>Sampling Hazard</b>	<b>Engineering Control</b>	<b>Administrative Control</b>	<b>Personal Protective Equipment</b>	<b>Weston FLD #</b>
<b>BIOLOGICAL</b>				
Insects	Remain safe distance from suspected hazards	Use buddy system/self-check to monitor for exposure	Proper work attire, insect repellant (if necessary)	43
Poisonous plants	Remain safe distance from suspected hazards	Use buddy system/self-check to monitor for exposure	Proper work attire	43
Animals	Remain safe distance from suspected hazards	Adhere strictly to avoidance policy	N/A	43
<b>RADIOLOGICAL</b>				
Sunlight/UV	Limit exposure to sunlight utilizing a canopy and proper work uniform	Use buddy system to monitor; SHSC to ensure use of proper work uniform and sunscreen as necessary	Proper work uniform, sunscreen (if necessary)	05
<b>CHEMICAL</b>				
Lead	N/A – airborne lead concentrations will not exceed OSHA Action Level	Ensure employees are enrolled in medical monitoring program, perform air monitoring in accordance with HASP	Proper work uniform, nitrile gloves, safety glasses, chemical-resistant boot covers	46
Nitric Acid (sample preservative and auger decontamination)	N/A	N/A	Proper work uniform, nitrile gloves, safety glasses	-

## **SECTION 8 - TRAINING AND MEDICAL REQUIREMENTS**

### **8.0 TRAINING AND MEDICAL REQUIREMENTS**

The following sections outline the training and medical surveillance requirements that must be met prior to individuals working on any known or suspected hazardous waste site.

#### **8.1 PERSONNEL TRAINING REQUIREMENTS**

Consistent with the OSHA 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel are required to be trained in accordance with the standard. At a minimum all personnel are required to be trained to recognize the on-site hazards, the provisions of this HASP, and the responsible personnel.

##### **8.1.1 Pre-assignment and Annual Refresher Training**

Prior to arrival on site, each employer will be responsible for certifying that his/her employees meet the requirements of pre-assignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). The employer should be able to provide a document certifying that each general site worker has received 40 hours of off-site instruction, as well as a minimum of 3 days actual field experience under the direct supervision of a trained, experienced supervisor. Workers who are on site only occasionally to perform a specific limited task and who are unlikely to be exposed to hazardous substances over their PELs, are required to have a minimum of 24 hours of instruction off site and a minimum of 8 hours of supervised field experience. If an individual employee has work experience and/or training that is equivalent to that provided in the initial training, an employer may waive the 40-hour training so long as that equivalent experience is documented or certified. All personnel must also receive 8 hours of refresher training annually.

##### **8.1.2 Site Supervisors Training**

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(8), individuals designated as site supervisors require an additional 8 hours of training.

##### **8.1.3 Training and Briefing Topics**

All site individuals will receive a pre-entry briefing by a qualified person. Topics to be discussed will be based on anticipated site hazards. All personnel shall be required to read and understand the requirements of the HASP prior to working on the project and will sign the HASP to indicate this has been completed.

### **8.2 MEDICAL SURVEILLANCE REQUIREMENTS**

Medical monitoring programs are designed to track the physical condition of employees on a regular basis, as well as survey pre-employment or baseline conditions prior to potential exposures. The medical surveillance program is a part of each employers Health and Safety program.

### **8.2.1 Baseline or Pre-assignment Monitoring**

Prior to being assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials, the employee must receive a pre-assignment or baseline physical. The contents of the physical are to be determined by the employer's medical consultant. As suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities, the minimum medical monitoring requirements for work at the site are as follows:

- Complete medical and work histories.
- Physical examination.
- Pulmonary function tests (FVC and FEV1).
- Chest X-ray (every 3 years).
- EKG.
- Eye examination and visual acuity.
- Audiometry.
- Urinalysis.
- Blood chemistry and heavy metals toxicology.

The pre-assignment physical should categorize employees as fit-for-duty and able to wear respiratory protection.

### **8.2.2 Periodic Monitoring**

In addition to a baseline physical, all employees require a periodic physical within the last 12 months unless the advising physician believes a shorter interval is appropriate. The employer's medical consultant should prescribe an adequate medical which fulfills OSHA 29 CFR 1910.120 requirements. The pre-assignment medical outlined above may be applicable.

All personnel working in contaminated or potentially contaminated areas at the site must be able to verify currency (within 12 months) with respect to medical monitoring and training.

### **8.2.3 Site Specific Medical Monitoring**

For activities at the New York City smelter sites, no specific tests will be required prior to individuals entering the Exclusion Zone or Contamination Reduction Zone other than standard medical monitoring and training requirements. Airborne lead concentrations will not be high enough to trigger OSHA lead standard requirements for blood testing. Cold or Heat Stress will be specifically monitored on the site, see Section 11.7 for specific information.

### **8.2.4 Exposure/Injury/Medical Support**

As a follow up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing.

Depending upon the type of exposure, it is critical to perform follow-up testing within 24 to 48 hours. It will be up to the employer's medical consultant to advise the type of test required to accurately monitor for exposure effects.

#### **8.2.5 Exit Physical**

At termination of employment or reassignment to an activity or location which does not represent a risk of exposure to hazardous substances, an employee shall require an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of the exit exam.

## **SECTION 9 - ZONES, PERSONAL PROTECTION, AND COMMUNICATION**

### **9.0 SITE ZONES**

The three general work zones established at the Site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone. A site map identifying the work zones will not generally be included in the HASP. The work zones will be determined in the field in accordance with HASP guidelines and marked out by the Site Manager prior to commencement of work activities.

#### **9.1 EXCLUSION ZONE**

The Exclusion Zone (EZ) is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone requires the use of personnel protective equipment.

#### **9.2 CONTAMINATION REDUCTION ZONE**

The Contamination Reduction Zone (CRZ) is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone will require personal protection as defined in the decontamination plan.

#### **9.3 SUPPORT ZONE**

The Support Zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. Personal protective equipment is therefore not required.

#### **9.4 PERSONAL PROTECTION**

This section describes the general requirements of the EPA-designated Levels of Protection (A-D), and the specific levels of protection required for each task at the Site.

##### **9.4.1 Levels of Protection**

Personnel wear protective equipment when assessment activities involve known or suspected atmospheric contamination vapors, gases, or particulates; or the potential for direct contact with skin-affecting substances exists. Full facepiece respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicant. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals.

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B is the primary level of choice when encountering unknown environments and/or handling/sampling unknown materials.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

Level D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise the type of chemical protective ensemble (i.e., material, format) will depend upon contaminants and degrees of contact.

The Level of Protection selection is based upon the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- Potential for exposure to substances in air, liquids, or other direct contact with material due to work being conducted.
- Knowledge of chemicals on site, along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are unknown, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better identified.

#### **9.4.2 Level A Personnel Protective Equipment:**

- Supplied-air respirator approved by the Mine Safety and Health Administration (MSHA) and National Institute for Occupational Safety and Health (NIOSH). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand, airline respirator (with escape bottle for Immediately Dangerous to Life and Health (IDLH) or potential for IDLH atmosphere)
- Fully encapsulating chemical-resistant suit
- Coveralls
- Long cotton underwear
- Gloves (inner)
- Boots, chemical-resistant, steel toe and shank (depending on suit construction, worn over or under suit boot)
- Hard hat (under suit)
- Disposable gloves and boot covers (worn over fully encapsulating suit)

- Cooling unit
- 2-way radio communications (intrinsically safe)

#### **9.4.3 Level B Personnel Protective Equipment:**

- Supplied-air respirator (MSHA/NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand, airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere)
- Chemical-resistant clothing (coveralls and long-sleeved jacket; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits)
- Long cotton underwear
- Coveralls
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boot covers (outer), chemical-resistant (disposable)
- Hard hat (face shield)
- 2-way radio communications (intrinsically safe)

#### **9.4.4 Level C Personnel Protective Equipment:**

- Air-purifying respirator, full-face, cartridge-equipped (MSHA/NIOSH approved)
- Chemical-resistant clothing (coveralls; hooded, one-piece or two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)
- Coveralls
- Long cotton underwear
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boot covers (outer), chemical-resistant (disposable)
- Hard hat (face shield)
- 2-way radio communications (intrinsically safe)

#### **9.4.5 Level D Personnel Protective Equipment:**

- Coveralls/long sleeves
- Gloves
- Boots/shoes, leather or chemical-resistant, steel toed
- Safety glasses
- Hard hat

#### **9.4.6 Reassessment of Protection Program**

The Level of Protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or findings of investigations. Changes in the level of protection shall be approved only by the WESTON HSO and/or the Site HSO.

When a significant change in site conditions occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site.
- Change in job tasks during a work phase.
- Significant change in weather.
- When temperature extremes or individual medical considerations limit the effectiveness of PPE.
- Contaminants other than those previously identified are encountered.
- Change in ambient levels of contaminants.
- Change in work scope which affects the degree of contact with contaminants.

#### **9.4.7 Respiratory Protection**

- All employees whose jobs may require the use of respiratory protection will be certified medically fit to use a respirator before being fit tested and issued a respirator.
- All employees whose jobs may require the use of respiratory protection will be certified annually as medically fit to use a respirator.
- Only employees who have successfully completed respiratory protection training shall be allowed to use respiratory protection. Respiratory protection training includes how to wear and maintain respirators properly, the proper use and limitations of respirators, and familiarization with respirators to be used at the job.
- Employees will be fit tested using OSHA-approved fit testing protocols before being issued any respirator and annually thereafter. Subcontractors shall provide certificate of respirator fit test completed within the last 12 months for each employee required to use respiratory protection on site.
- If an employee has difficulty in breathing during the fit test or during use, he shall be evaluated medically to determine if he can wear a respirator safely while performing assigned tasks.
- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the health or safety of the employee will be impaired by respirator use.

- Contact lenses shall not be worn while using any type of respiratory protection.
- Facial hair that might interfere with a good facepiece seal or proper operation of the respirator is prohibited.
- An employee will be issued only those respirators for which he/she has been successfully fit tested.
- Only properly cleaned, maintained, National Institute of Occupational Safety and Health (NIOSH)-approved respirators shall be used on site.
- Selection of respirators, as well as any decisions regarding upgrading or downgrading of respiratory protection, will be made by the Site HSO and/or SAT HSO.
- Air purifying respirators (APRs) will not be used in heavily contaminated atmospheres where the protection factor is likely to be exceeded. The nature and concentration range of the contamination must be known before an APR may be selected for use.
- Used APR cartridges shall be replaced at the end of each shift or sooner if the user notices break-through or increased breathing resistance. PAPR cartridges will be changed when flow falls below 4 cfm through the cartridge.
- Positive and negative pressure tests shall be performed each time the respirator is donned.
- Air-supplied respirators shall be assembled according to manufacturer's specifications. Hose length, couplings, valves, regulators, manifolds and all accessories shall meet ANSI and the manufacturer's requirements.
- Respirators shall be cleaned and sanitized before and after use.
- Respirators shall be inspected during cleaning. Worn or deteriorated parts shall be replaced.
- The SAT HSO shall review the respiratory protection program regularly to ensure employees are properly wearing and maintaining their respirators and that the respirator protection is adequately protecting the employees.

#### 9.4.8 Task Specific PPE Requirements

TASK	LEVEL OF PROTECTION	SPECIFIC MATERIALS
All Tasks	D	Inner Glove - Nitrile Outer Glove - Nitrile Inner Boot - Steel toe boots Outer Boot – Over boot covers if work area is muddy or has significant staining. Body Covering - Safety Glasses, proper work uniforms Respirator/Cartridge - N/A

#### 9.5 COMMUNICATIONS

Successful communications between field teams and contact with personnel in the support zone are essential, as is communication with off-site agencies such as police and fire. The following communications systems will be available during activities at the Site (check all systems that apply):

☐ Intrinsically Safe Radio  
☐ Compressed Air Horn  
☐ Public Telephone (location ) (number - )  
☐ Site Telephone (location ) (number - )  
☒ Portable Telephone (location PM ) (number – (908) 472-8409)

All on-site personnel shall be familiar with the meanings of the following hand signals:

Hand Signal	Definition
-----	-----
Hands clutching throat	Out of air/cannot breathe
Hands on top of head	Needs assistance
Thumbs up	OK/I am all right/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

#### 9.6 IDENTIFICATION OF NEAREST MEDICAL ASSISTANCE

As part of the site control program, the PM must post the identification and location of the nearest medical facilities where response personnel can receive assistance in the event of an emergency. Medical facilities typically include area hospitals, emergency clinics, on-call physicians, medical specialists, or emergency, ambulance, fire, and police services. Information on the nearest medical facility for this site can be found in Section 14.5.

If there is no medical facility in close proximity to the site, at least one individual on site must be trained to render first aid in the event of an emergency. The following individual(s) on site are certified to perform first aid:

<u>NAME</u>	<u>FIRST AID/CPR EXPIRATION DATE</u>
Denise Breen	February 7, 2015 / February 7, 2015

## SECTION 10 - MONITORING PROCEDURES

### 10.0 AIR MONITORING AND ACTION LEVELS

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on site.

### 10.1 ROUTINE AIR MONITORING REQUIREMENT

The following are the routine air monitoring requirements:

- Upon initial entry, representative air monitoring shall be conducted to identify IDLH conditions, exposure above OSHA-PELs, or other published exposure levels including exposure to radiation, flammable atmospheres, and/or oxygen deficient atmospheres;
- When the possibility of an IDLH condition or flammable atmosphere has developed;
- When work begins on a different portion of the site;
- Contaminants other than those previously identified are being handled;
- A different type of operation is initiated;
- Employees are handling leaking drums or containers or working in areas with obvious liquid contamination;
- Continuously during confined space work; and
- At the end of daily site operations.

Air monitoring will consist at a minimum of the criteria listed below. All air monitoring data will be documented and will be available in the WESTON site file for review. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturers' specifications.

### 10.2 SITE-SPECIFIC AIR MONITORING REQUIREMENTS

Instrument	Compounds to Detect	Frequency	Comments/ Action Level
Multi-RAE multi-gas meter, incl. photoionization detector (PID) (during sampling activities at SGC site only)	Volatile Organic Compounds	Initial Entry; constantly during Level D operations; periodically during Level C operations	>1 units sustained in breathing zone - Level C or follow Weston Benzene OP >5 units - suspend operations and consult HSO/PM
PDR-1000 Dust Meter	Metals adsorbed to dust/particulates	Initial Entry; constantly during Level D operations; periodically during Level C operations	> 2.5 mg/m <sup>3</sup> in breathing zone – Level C (based on ½ the OSHA nuisance dust exposure limit – respirable fraction ) *

\*Will be updated based upon site-specific soil concentrations for lead

## **SECTION 11 - SAFETY CONSIDERATIONS**

### **11.0 INTRODUCTION**

The following is a brief description of various safety conditions that workers can expect to encounter in the field. It is not comprehensive. Refer to Section 7.1 for a task-specific hazard analysis for the Buffalo smelter sites and refer to the attached Weston FLDs in Appendix G for complete procedures.

### **11.1 LIGHTING**

Work areas must have adequate lighting for employees to see to work and identify hazards (5 foot candles minimum - comparable to a single 75 or 100 watt bulb). Personnel should carry flashlights in all normally dark areas for use in the event of a power failure. Applicable OSHA standards for lighting, 29 CFR 1910.120(m) shall apply.

### **11.2 ELECTRICAL POWER**

All electrical power must have a ground fault circuit interrupter as part of the circuit. All equipment must be suitable and approved for the class of hazard. Applicable OSHA standards for electrical, 29 CFR 1926 Subpart K, shall apply.

### **11.3 EYE WASH PROTECTION**

All operations involving the potential for eye injury, splash, etc., must have approved eye wash units locally available as per 29 CFR 1910.151(c).

### **11.4 FIRE PROTECTION/FIRE PREVENTION**

Operations involving the potential for fire hazards shall be conducted in a manner as to minimize the risk. Non-sparking tools and fire extinguishers shall be used or available as appropriate. Sources of ignition shall be removed. When necessary, explosion-proof instruments and/or bonding and grounding will be used to prevent fire or explosion.

### **11.5 UTILITIES**

Overhead and underground utility hazards shall be identified and/or inspected prior to conducting operations involving potential contact.

### **11.6 SLIPS, TRIPS, AND FALLS**

Caution will be used to reduce general physical hazards. Where there is a fall potential, it will be guarded or posted to prevent employee use.

## **11.7 HEAT STRESS**

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. Heat stress disorders include: heat rash, heat cramps, heat exhaustion, and heat stroke.

Heat stress can be prevented by assuring an adequate work/rest schedule. It is recommended that workers break a minimum 10 to 15 minutes for every 2 hours when temperature exceeds 72.5 degrees F and protective clothing is worn. More frequent breaks are necessary as the temperatures and level of protection are increased.

A work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by one-third. The initial rest period should be at least 5 minutes.

## **11.8 COLD STRESS**

Caution will be used to reduce cold stress hazards. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards.

- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Wear waterproof, slip-resistant, insulated boots
- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will “breathe” or allow water vapor to escape.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.

## **11.9 NOISE**

Hearing protection is required for workers working around noise sources where the noise level is greater than 85 dBA (time weighted average).

## **SECTION 12 - STANDARD SAFE WORK PRACTICES**

### **12.0 GENERAL**

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, smoking dope, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the exclusion zone and contamination reduction zone.
- Hands and face must be washed upon leaving the exclusion zone and before eating, drinking, chewing gum, tobacco, smoking, or other activities which may result in ingestion of contamination.
- A buddy system will be used. Hand signals will be established to maintain communication.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between buddies on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy will be immediately dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.

## **SECTION 13 - DECONTAMINATION PROCEDURES**

### **13.0 DECONTAMINATION PLAN**

Any site where hazardous waste cleanup operations occur must have a plan that outlines decontamination procedures. These procedures must be made available to employees and must be implemented before anyone enters areas on-site where there is suspected contamination. The plan must ensure that chosen decontamination methods are effective for the specific hazardous substances present, and that the methods themselves do not pose any health or safety hazards.

The Site HSO will be responsible for monitoring the decontamination procedures. Monitoring will include reviewing the decontamination procedures to ensure that they are adequate for removal of the site contaminants, and ensuring that proper decontamination procedures are being followed.

### **13.1 PERSONNEL DECONTAMINATION**

All personnel leaving the contaminated area of a site (the Exclusion Zone) must be decontaminated to remove any harmful chemicals or infectious organisms that may have adhered to them. The procedures given are for the maximum and minimum amount of decontamination used for each level of protection.

The maximum decontamination procedures for all levels of protection consist of specific activities at 19 stations. Each station emphasizes an important aspect of decontamination. Decontamination lines are site-specific and vary depending on the types of contamination and work activities conducted on-site.

### **13.2 EQUIPMENT DECONTAMINATION**

Sampling equipment will be decontaminated in accordance with procedures as defined in the sampling plan. The sequence of decontamination steps required for non-sampling equipment can be found in the Sampling Plan.

### **13.3 DISPOSITION OF DECONTAMINATION WASTES**

Investigation-derived wastes generated during the site inspection will be disposed of in accordance with OERR Directive 9345.3-02, Management of Investigation-Derived Wastes During Site Inspections (May 1991), or most recent directive regarding disposal of such wastes.

## **SECTION 14 - EMERGENCY PLAN**

### **14.0 EMERGENCY RESPONSE/CONTINGENCY PLAN**

This section describes contingencies and emergency planning procedures to be implemented at the site. This plan is compatible with local, state and federal disaster and emergency management plans as appropriate.

#### **14.1 PRE-EMERGENCY PLANNING**

During the site briefings held prior to field work, all employees will be trained in and reminded of provisions of the emergency response plan, communication systems, and evacuation routes. Section 7.1 identifies the hazardous conditions associated with specific site activities. The plan will be reviewed by the SAT HSO and revised if necessary. This will ensure that the plan is adequate and consistent with prevailing site conditions.

#### **14.2 PERSONNEL ROLES AND LINES OF AUTHORITY**

The WESTON PM has primary responsibility for responding to and correcting emergency situations if safely possible. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area. He/she is additionally responsible for ensuring that appropriate authorities are notified and follow-up reports completed. The HSO may be called upon to act on the behalf of the WESTON PM, and will direct responses to any medical emergency.

#### **14.3 SITE SECURITY**

During any emergency situation it is important that site security and control are maintained. The WESTON PM will be responsible for ensuring that no individuals are allowed to enter the site or be put in any danger due to the nature of the emergency situation on the site. The Site Security Checklist is included as Appendix J.

#### **14.4 EMERGENCY RECOGNITION/PREVENTION**

Personnel will be familiar with techniques of hazard recognition from pre-assignment training and site-specific briefings. The HSO is responsible for ensuring that prevention devices or equipment are available to personnel. The following presents a list of potential hazards and prevention/control measures:

<u>HAZARD</u>	<u>PREVENTION/CONTROL</u>	<u>LOCATION</u>
Fire/Explosion	Fire Extinguisher Alarm System Fire Inspections	To Be Determined
Spill	Berms/Dikes Sorbent Materials Foams	To Be Determined
Air Release	Water Spray Foam Alarm System Evacuation Routes	To Be Determined

The locations of the equipment will be discussed during the site specific briefing and periodically during the project.

#### **14.5 EVACUATION ROUTES/PROCEDURES**

In the event of an emergency which necessitates an evacuation of the site, the following alarm procedures will be implemented:

- Evacuation alarm notification should be made using three short blasts on the air horn, supplemented by the use of cell phones.
- All personnel should evacuate to a location upwind of any activities. Ensure that a predetermined location is identified off site in case of an emergency, so that all personnel can be accounted for. The predetermined location will be identified during the daily safety meeting.
- Personnel will be expected to proceed to the closest exit with your buddy, and mobilize to the safe distance area associated with the evacuation route.
- Personnel will remain at that area until the re-entry alarm is sounded or an authorized individual provides further instructions.

#### **14.6 SAFE DISTANCES AND PLACES OF REFUGE**

No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), WESTON team members in the affected area will report initially to the contamination reduction zone. Small spills or

leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the WESTON PM or his/her designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to delineate and secure the boundaries.

In the event of a major hazardous material release (large spills of high toxicity/greater than 55 gallons), field team members will be evacuated from the building/site. The team will assemble at the entrance to the site for a head count by the WESTON PM and to await further instruction.

If an incident may threaten the health or safety of the surrounding community, the WESTON PM, or his/her designee will inform the proper agencies so that the public can be informed.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incident:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the command post, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

## **14.7 EMERGENCY CONTACT/NOTIFICATION SYSTEM**

The following list provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the HSO and notify the appropriate emergency organization. In the event of a fire or spill, the site supervisor will notify the appropriate local, state, and federal agencies. Section 14.7.1 presents a Route To Hospital Map.

<u>Organization</u>	<u>Contact</u>	<u>Telephone</u>
Ambulance:	Local Ambulance	911
Police:	Local Police	911
Fire:	Local Fire Dept.	911

**Directions to Hospital for Brooklyn Sites (Kornblum, Sidney; Pittsburgh White Metal and  
Columbia Smelting & Refining):**

**The Brooklyn Hospital Center  
121 Dekalb Ave  
Brooklyn, NY 11210**

**(718) 250-8000**

**Directions to Hospital for Bronx Site (New York Solder Co.)**

**Jack D. Weiler Hospital  
1825 Eastchester Rd.  
Bronx, NY 10461**

**(718) 904-3333**

**Directions vary based on site, see the following Route To Hospital Maps**

**ROUTE TO HOSPITAL AND MAP**  
**NEW YORK SOLDER CO.**



Trip to:

















**1825 Eastchester Rd**

Bronx, NY 10461-2338

6.79 miles / 13 minutes

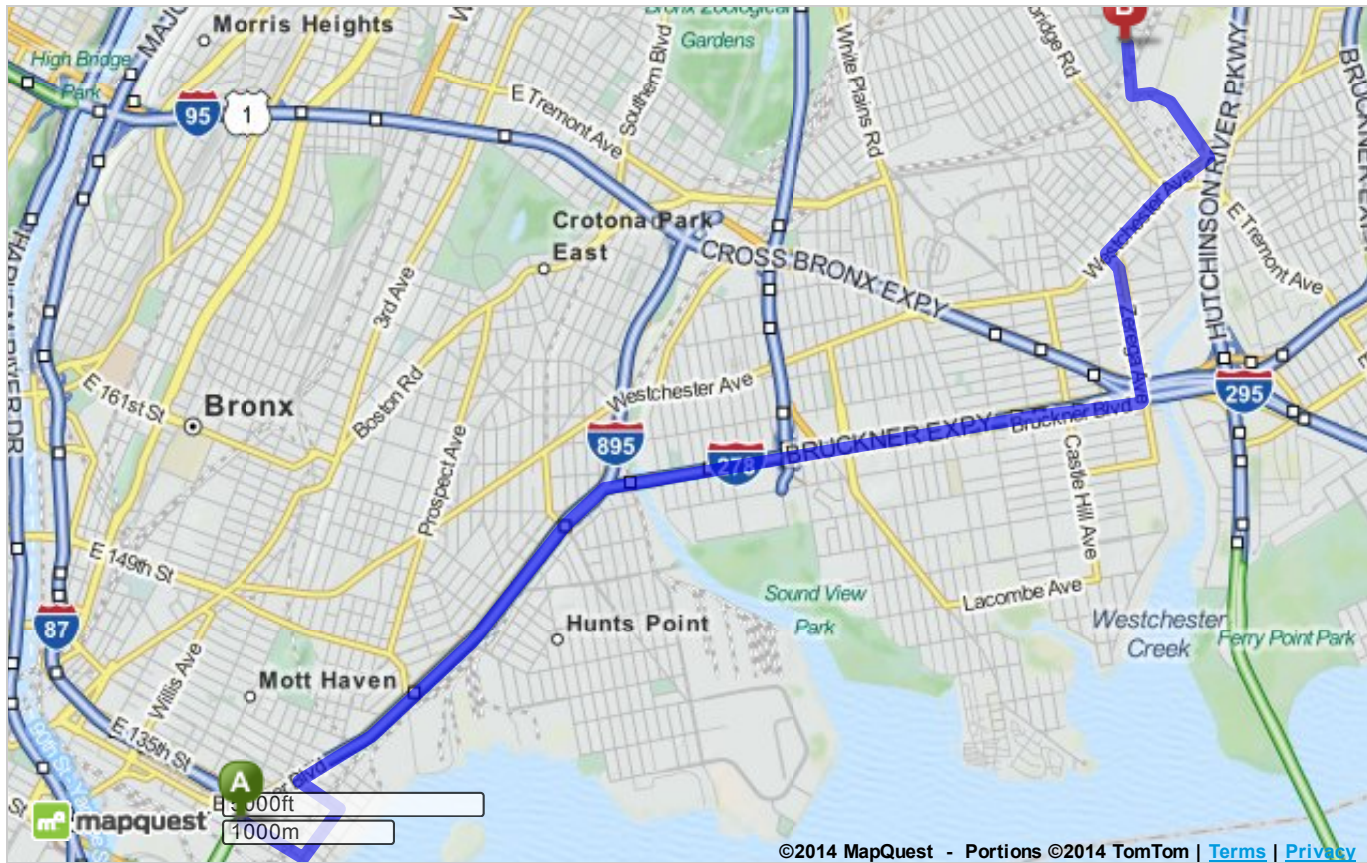
## Notes

From New York Solder Co to Jack D Wieler Hospital  
1825 Eastchester Rd Bronx NY 10461  
(718) 904-3333

	<b>684 E 133rd St, Bronx, NY 10454-3406</b>	Download Free App
	1. Start out going <b>southeast</b> on <b>E 133rd St</b> toward <b>Willow Ave.</b> <a href="#">Map</a>	<b>0.3 Mi</b>
	2. Turn <b>left</b> onto <b>Rose Feiss Blvd.</b> <a href="#">Map</a> <i>Rose Feiss Blvd is 0.1 miles past Willow Ave</i> <i>If you reach Locust Ave you've gone a little too far</i>	<b>0.3 Mi</b>
	3. Turn <b>left</b> onto <b>E 138th St.</b> <a href="#">Map</a> <i>E 138th St is just past E 137th St</i> <i>If you reach E 139th St you've gone a little too far</i>	<b>0.2 Mi</b>
	 4. Merge onto <b>I-278 E / Bruckner Expy E.</b> <a href="#">Map</a> <i>If you reach Jackson Ave you've gone a little too far</i>	<b>1.6 Mi</b>
	 5. Keep <b>left</b> to take <b>I-278 E / Bruckner Expy E</b> toward <b>New Haven.</b> <a href="#">Map</a>	<b>2.1 Mi</b>
	6. Take the <b>I-678 S / I-295 S</b> exit, <b>EXIT 54</b> , toward <b>Whitestone Brg / Throgs Neck Brg.</b> <a href="#">Map</a>	<b>0.2 Mi</b>
	7. Keep <b>right</b> to take the ramp toward <b>Zerega Ave.</b> <a href="#">Map</a>	<b>0.3 Mi</b>
	8. Merge onto <b>Bruckner Blvd.</b> <a href="#">Map</a>	<b>0.01 Mi</b>
	9. Take the 1st <b>left</b> onto <b>Zerega Ave.</b> <a href="#">Map</a> <i>If you reach Brush Ave you've gone about 0.1 miles too far</i>	<b>0.7 Mi</b>
	10. Turn <b>right</b> onto <b>Westchester Ave.</b> <a href="#">Map</a> <i>Westchester Ave is just past Butler Pl</i> <i>King House is on the corner</i>	<b>0.6 Mi</b>
	11. Turn <b>left</b> onto <b>Waters Pl.</b> <a href="#">Map</a> <i>Waters Pl is just past Waters Ave</i> <i>If you reach Hutchinson River Pkwy you've gone a little too far</i>	<b>0.5 Mi</b>
	12. Turn <b>right</b> onto <b>Eastchester Rd.</b> <a href="#">Map</a> <i>Subway is on the right</i>	<b>0.2 Mi</b>
	13. <b>1825 EASTCHESTER RD</b> is on the <b>left.</b> <a href="#">Map</a> <i>Your destination is just past Sackett Ave</i> <i>If you reach Loomis St you've gone a little too far</i>	

**1825 Eastchester Rd, Bronx, NY 10461-2338**

Total Travel Estimate: **6.79 miles - about 13 minutes**



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**ROUTE TO HOSPITAL AND MAP**

**KORNBLUM, SIDNEY**



Trip to:

**121 Dekalb Ave**

Brooklyn, NY 11201

3.44 miles / 13 minutes

## Notes

From Kornblum, Sidney to The Brooklyn Hospital Center  
121 Dekalb Ave  
Brooklyn, NY  
(718) 250-8000

**394 Johnson Ave**, Brooklyn, NY 11206-2803Download  
Free App

1. Start out going **east** on **Johnson Ave** toward **Morgan Ave**. [Map](#) **0.03 Mi**

2. Take the 1st **right** onto **Morgan Ave**. [Map](#) **0.3 Mi**  
*Emily J Deli Inc is on the right*  
*If you reach Knickerbocker Ave you've gone a little too far*

3. Turn **right** onto **Flushing Ave**. [Map](#) **1.2 Mi**  
*Flushing Ave is just past Rock St*  
*Hops & Hocks is on the left*  
*If you are on Wilson Ave and reach Noll St you've gone a little too far*

4. Turn **left** onto **Nostrand Ave**. [Map](#) **0.3 Mi**  
*Nostrand Ave is 0.1 miles past Marcy Ave*  
*Cong Hisachois Talmiday Wyznitz is on the corner*  
*If you reach Warsoff Pl you've gone a little too far*

5. Take the 2nd **right** onto **Myrtle Ave**. [Map](#) **1.1 Mi**  
*Myrtle Ave is 0.1 miles past Park Ave*  
*Lucky Liquor Store is on the corner*  
*If you reach Vernon Ave you've gone a little too far*

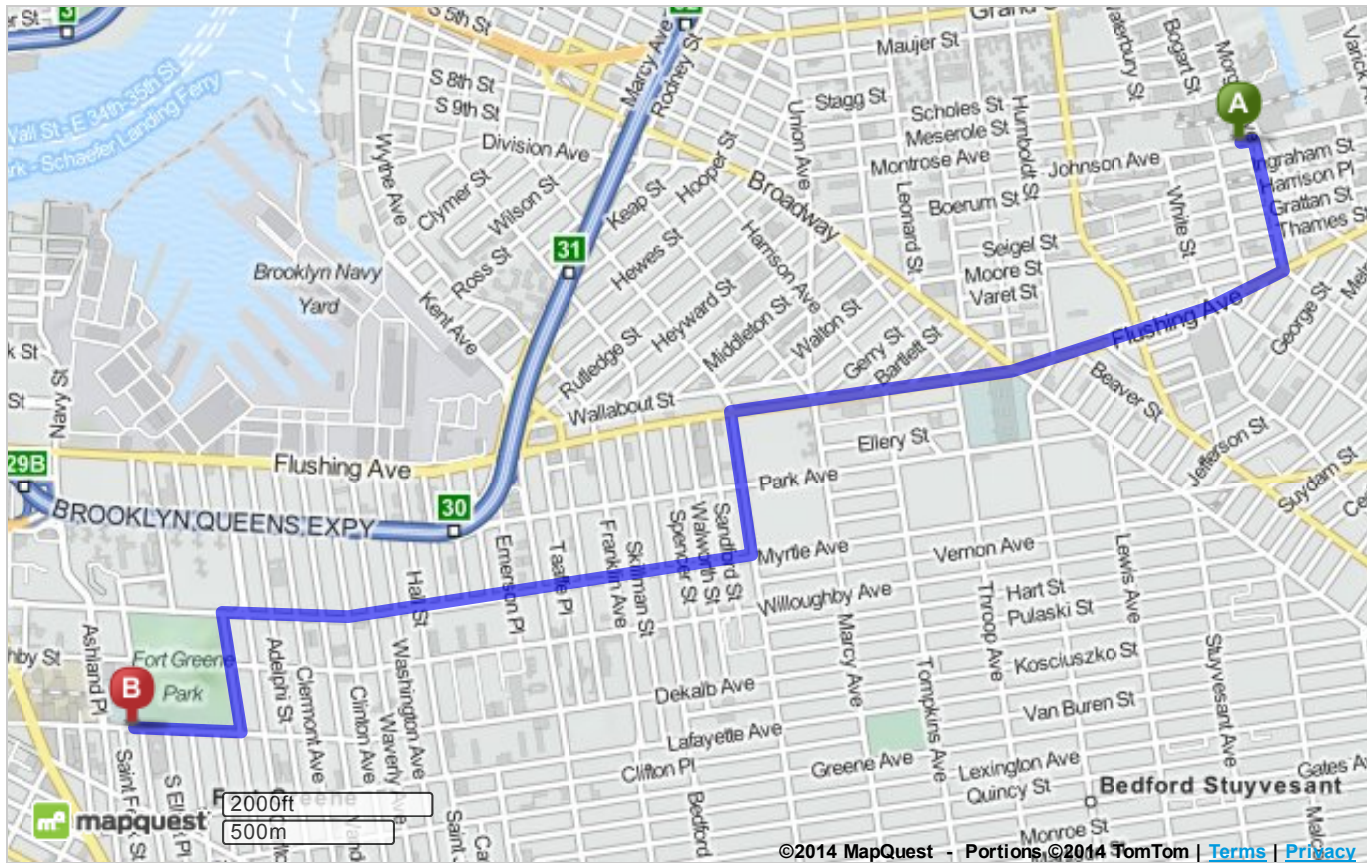
6. Turn **left** onto **Washington Park**. [Map](#) **0.3 Mi**  
*Washington Park is just past Carlton Ave*  
*R & M Grocery is on the left*  
*If you reach Washington Walk you've gone a little too far*

7. Take the 1st **right** onto **Dekalb Ave**. [Map](#) **0.2 Mi**  
*Dekalb Ave is 0.1 miles past Willoughby Ave*  
*Sammy Grocery Deli Corporation is on the right*  
*If you are on Cumberland St and reach Lafayette Ave you've gone about 0.1 miles too far*

8. **121 DEKALB AVE** is on the **right**. [Map](#)  
*Your destination is just past Fort Greene Pl*  
*If you reach Saint Felix St you've gone a little too far*

**121 Dekalb Ave**, Brooklyn, NY 11201

Total Travel Estimate: **3.44 miles - about 13 minutes**



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**ROUTE TO HOSPITAL AND MAP**  
**PITTSBURGH WHITE METAL**



Trip to:

**121 Dekalb Ave**

Brooklyn, NY 11201

2.77 miles / 8 minutes

## Notes

From PWM to The Brooklyn Hospital Center  
212 Dekalb Ave  
Brooklyn, NY  
(718) 250-8000

There is a timed restriction on your route

	<b>284 Hamilton Ave, Brooklyn, NY 11231-3208</b>	Download Free App
	1. Start out going <b>southeast</b> on <b>Hamilton Ave</b> toward <b>W 9th St</b> . <a href="#">Map</a>	<b>0.06 Mi</b>
	2. Turn <b>left</b> onto <b>Clinton St</b> . <a href="#">Map</a> <i>Clinton St is just past W 9th St New Lin's Garden Kitchen is on the corner If you reach Mill St you've gone a little too far</i>	<b>0.04 Mi</b>
	3. Turn <b>slight left</b> onto <b>Hamilton Ave</b> . <a href="#">Map</a>	<b>0.2 Mi</b>
 	4. Merge onto <b>I-278 E / Brooklyn Queens Expy E / Queens Midtown Expy N</b> toward <b>Queens / Bronx</b> . <a href="#">Map</a>	<b>0.9 Mi</b>
	5. Take the <b>Atlantic Ave</b> exit, <b>EXIT 27</b> . <a href="#">Map</a>	<b>0.05 Mi</b>
	6. Merge onto <b>Atlantic Ave</b> . <a href="#">Map</a>	<b>0.5 Mi</b>
	7. Turn <b>left</b> onto <b>Smith St</b> . <a href="#">Map</a> <i>The New St. Clair Restaurant is on the corner If you reach Hoyt St you've gone about 0.1 miles too far</i>	<b>0.1 Mi</b>
	8. Take the 3rd <b>right</b> onto <b>Livingston St</b> . <a href="#">Map</a> <i>Livingston St is just past Schermerhorn St New Apollo Diner is on the corner If you reach Fulton St you've gone a little too far</i>	<b>0.3 Mi</b>
	9. Turn <b>left</b> onto <b>Hanover Pl</b> . <a href="#">Map</a> <i>Hanover Pl is just past Bond St Enterprise Rent-A-Car is on the right If you reach Nevins St you've gone a little too far</i>	<b>0.07 Mi</b>
	10. Turn <b>right</b> onto <b>Fulton St</b> . <a href="#">Map</a> <i>Duane Reade is on the right Closed to vehicle traffic: Everyday 2:00 AM to 7:00 PM</i>	<b>0.3 Mi</b>
	11. Turn <b>left</b> onto <b>Fort Greene Pl</b> . <a href="#">Map</a> <i>Fort Greene Pl is just past Saint Felix St S. S. Brooklyn Pizza is on the left If you reach Lafayette Ave you've gone a little too far</i>	<b>0.2 Mi</b>
	12. Turn <b>left</b> onto <b>Dekalb Ave</b> . <a href="#">Map</a>	<b>0.02 Mi</b>



*Luv-n-oven Pizza is on the left*



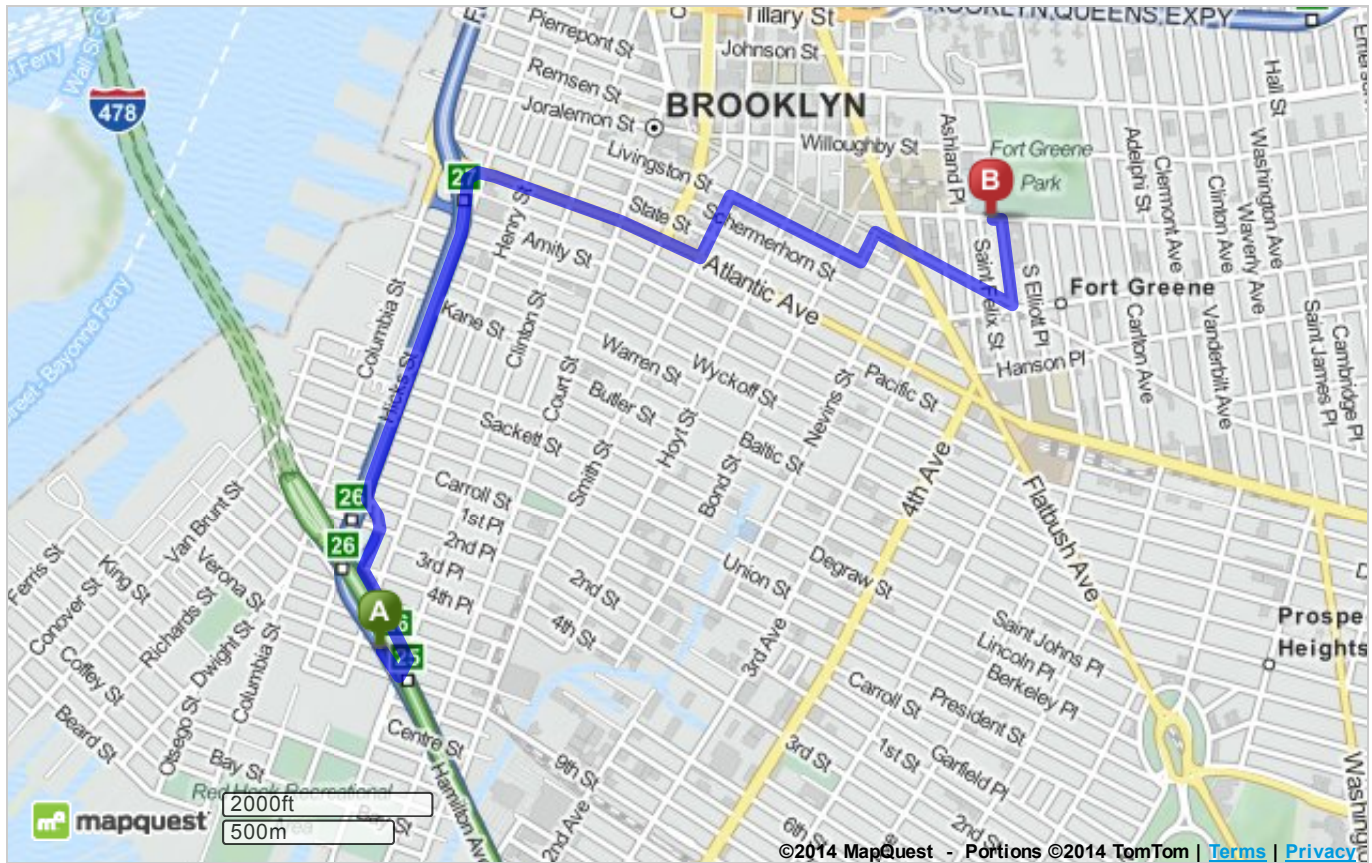
13. **121 DEKALB AVE** is on the **right**. [Map](#)

*If you reach Saint Felix St you've gone a little too far*



**121 Dekalb Ave, Brooklyn, NY 11201**

Total Travel Estimate: **2.77 miles - about 8 minutes**



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**ROUTE TO HOSPITAL AND MAP**  
**COLUMBIA SMELTING & REFINING**



Trip to:

**121 Dekalb Ave**

Brooklyn, NY 11201

3.06 miles / 9 minutes

## Notes

CSR to The Brooklyn Hospital Center  
212 Dekalb Ave  
Brooklyn, NY  
(718) 250-8000

There is a timed restriction on your route

	98 Lorraine St, Brooklyn, NY 11231-2223	Download Free App
	1. Start out going <b>east</b> on <b>Lorraine St</b> toward <b>Henry St</b> . <a href="#">Map</a>	0.2 Mi
	2. Take the 2nd <b>left</b> onto <b>Clinton St</b> . <a href="#">Map</a> <i>Clinton St is 0.1 miles past Henry St</i> <i>If you reach Court St you've gone about 0.1 miles too far</i>	0.2 Mi
	3. Turn <b>slight left</b> onto <b>Hamilton Ave</b> . <a href="#">Map</a> <i>Hamilton Ave is just past W 9th St</i>	0.2 Mi
	4. Merge onto <b>I-278 E / Brooklyn Queens Expy E / Queens Midtown Expy N</b> toward <b>Queens / Bronx</b> . <a href="#">Map</a>	0.9 Mi
	5. Take the <b>Atlantic Ave</b> exit, <b>EXIT 27</b> . <a href="#">Map</a>	0.05 Mi
	6. Merge onto <b>Atlantic Ave</b> . <a href="#">Map</a>	0.5 Mi
	7. Turn <b>left</b> onto <b>Smith St</b> . <a href="#">Map</a> <i>The New St. Clair Restaurant is on the corner</i> <i>If you reach Hoyt St you've gone about 0.1 miles too far</i>	0.1 Mi
	8. Take the 3rd <b>right</b> onto <b>Livingston St</b> . <a href="#">Map</a> <i>Livingston St is just past Schermerhorn St</i> <i>New Apollo Diner is on the corner</i> <i>If you reach Fulton St you've gone a little too far</i>	0.3 Mi
	9. Turn <b>left</b> onto <b>Hanover Pl</b> . <a href="#">Map</a> <i>Hanover Pl is just past Bond St</i> <i>Enterprise Rent-A-Car is on the right</i> <i>If you reach Nevins St you've gone a little too far</i>	0.07 Mi
	10. Turn <b>right</b> onto <b>Fulton St</b> . <a href="#">Map</a> <i>Duane Reade is on the right</i> <i>Closed to vehicle traffic: Everyday 2:00 AM to 7:00 PM</i>	0.3 Mi
	11. Turn <b>left</b> onto <b>Fort Greene Pl</b> . <a href="#">Map</a> <i>Fort Greene Pl is just past Saint Felix St</i> <i>S. S. Brooklyn Pizza is on the left</i> <i>If you reach Lafayette Ave you've gone a little too far</i>	0.2 Mi
	12. Turn <b>left</b> onto <b>Dekalb Ave</b> . <a href="#">Map</a>	0.02 Mi



*Luv-n-oven Pizza is on the left*



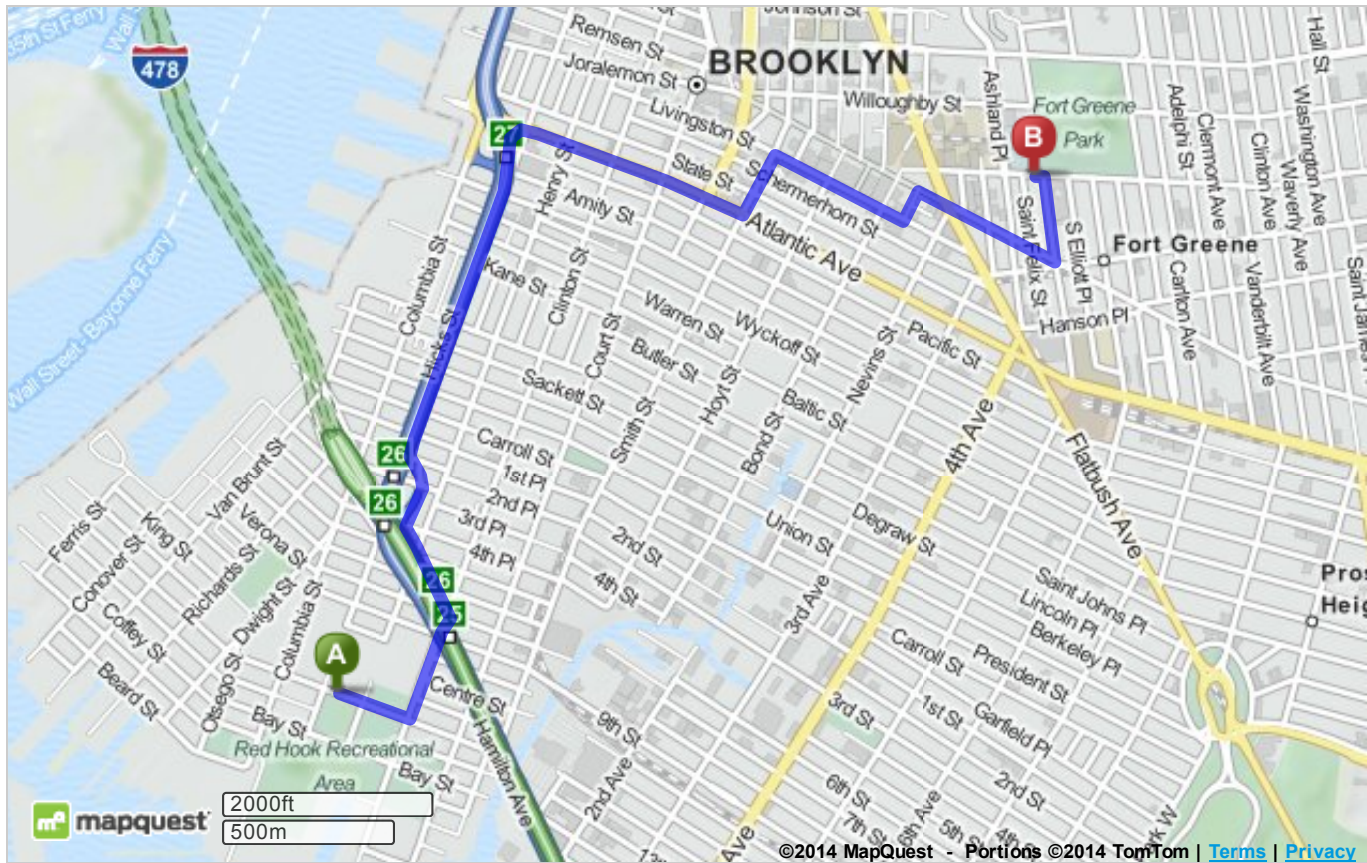
13. **121 DEKALB AVE** is on the **right**. [Map](#)

*If you reach Saint Felix St you've gone a little too far*



**121 Dekalb Ave, Brooklyn, NY 11201**

Total Travel Estimate: **3.06 miles - about 9 minutes**



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## **14.8 EMERGENCY MEDICAL TREATMENT PROCEDURES**

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the PM.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site. This information is included in Table 3.1.

Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

## **14.9 FIRE OR EXPLOSION**

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the PM or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on site.

If it is safe to do so, site personnel may:

- Use firefighting equipment available on site to control or extinguish the fire; and,
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

## **14.10 SPILL OR LEAK**

In the event of a spill or a leak, site personnel will:

- Inform their supervisor immediately;
- Locate the source of the spillage and stop the flow if it can be done safely; and,
- Begin containment and recovery of the spilled materials if safely possible.

## **14.11 EMERGENCY EQUIPMENT/FACILITIES**

The following is a list of potentially available emergency equipment on site:

- First aid kit
- Fire extinguisher
- Site telephone
- Solvent material
- Eye wash
- Berm materials

## **14.12 SITE TOPOGRAPHY, LAYOUT AND WEATHER CONDITIONS**

Prior to work beginning at a site it is important to note particulars about that site that might be important during an emergency situation. In particular, it is important to note specifics about the site topography, the layout of the site and any special weather conditions that are known or are expected to occur. This information should then be used to ensure that emergency response planning has taken into account site-specific requirements.

### **SITE TOPOGRAPHY –**

Topography on and around all the New York City smelter sites is generally flat.

### **LAYOUT-**

#### **New York Solder Co.**

The reconnaissance confirmed that the entire subject property is comprised of a building, to the edges of the sidewalk. Currently the site is being used as a Twins Electric supply warehouse. There is no exposed soil on site. Off-site sampling locations are situated in a public park, private properties (a residential property and the New York Sanitation property), and public ROWs.

#### **Kornblum, Sidney Metals Co.**

The entire subject property is comprised of a concrete building with no exposed soil. There are backyards with exposed soil and trees at the apartment buildings immediately south of the subject property. Off-site sampling locations are in street trees and public ROWs.

#### **Pittsburgh White Metal**

An iron fence surrounds the 284 Hamilton Avenue parcel. No exposed soil was observed along Hamilton or Huntington Avenues on or in the immediate vicinity of the subject property. Adjacent to the south and west side of the subject property, residential properties were observed along West 9th Street and Henry Street. Off-site sampling locations are situated in New York City Housing Authority (NYCHA) property and public ROWs.

#### **Columbia Smelting & Refining Works**

A baseball field (one of four baseball fields located on the aforementioned playground area) was observed on the former location of the subject property. Off-site sampling locations are situated in NYCHA property, public parks and public ROWs.

**Weather Conditions** - Weather conditions are expected to be typical of New York city in mid-autumn – cool mornings and cool to warm afternoons with temperatures ranging from 30° F to 75° F.

## **14.13 ACCIDENT REPORT**

For all occupational injuries, accident, and/or illness that occurs on site, an Employee Incident Report must be filled out and given to the WESTON HSO.

## SECTION 15 - MEDICAL DATA SHEET/FIELD TEAM REVIEW

### 15.0 FIELD TEAM DATA

Name	40-Hour Training	8-Hour Refresher*	Supervisor Training	First Aid/ CPR *	Fit Test *	Medical*
Denise Breen	3/1/2012	1/27/2015	7/11/2013	2/7/2015	6/23/2015	12/17/2014
Scott Snyder	9/10/1999	9/23/2015	12/22/1999	-	2/12/2015	9/16/2015
TBD						

\* Expires

---



**APPENDIX A**  
**CHEMICAL DATA SHEETS (CONTAMINANTS OF CONCERN)**

---

# International Chemical Safety Cards

## LEAD

ICSC: 0052

 			
<p>Lead metal Plumbum Pb (powder) ICSC # 0052 CAS # 7439-92-1 RTECS # <a href="#">OF7525000</a> August 10, 2002 Validated</p>			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter	Separated from food and feedstuffs and incompatible materials . See Chemical Dangers.		

the environment. Personal protection:  
P3 filter respirator for toxic particles.

### SEE IMPORTANT INFORMATION ON BACK

**ICSC: 0052**

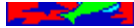
Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

## International Chemical Safety Cards

**LEAD**

**ICSC: 0052**

I M P O R T A N T D A T A	<b>PHYSICAL STATE; APPEARANCE:</b> BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.
	<b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.	<b>INHALATION RISK:</b> A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.
	<b>CHEMICAL DANGERS:</b> On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b>
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.05 mg/m³ as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004). MAK: Carcinogen category: 2; Germ cell mutagen group: 3A; (DFG 2006). EU OEL: as TWA 0.15 mg/m³; (EU 2002). OSHA PEL*: 1910.1025 TWA 0.050 mg/m³ <a href="#">See Appendix C</a> *Note: The PEL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a> . NIOSH REL*: TWA 0.050 mg/m³ <a href="#">See Appendix C</a> *Note: The REL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a> . NIOSH IDLH: 100 mg/m³ (as Pb) See: <a href="#">7439921</a>	<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood , bone marrow , central nervous system , peripheral nervous system and kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development. This substance is probably carcinogenic to humans. fast track change Oct 06 - IARC 2A.
<b>PHYSICAL PROPERTIES</b>	Boiling point: 1740°C Melting point: 327.5°C  Density: 11.34 g/cm³ Solubility in water: none	
<b>ENVIRONMENTAL DATA</b>	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.	

	
<b>NOTES</b>	
Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Card has been partly updated in April 2005. See section Occupational Exposure Limits. Card has been partly updated in October 2006: see section Occupational Exposure Limits, Effects Long Tem Exposure.	
<b>ADDITIONAL INFORMATION</b>	
<b>ICSC: 0052</b>	<b>LEAD</b>
(C) IPCS, CEC, 1994	
<b>IMPORTANT LEGAL NOTICE:</b>	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

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**APPENDIX B**  
**CHEMICAL DATA SHEETS (SAMPLE PRESERVATION)**

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# International Chemical Safety Cards

## NITRIC ACID

ICSC: 0183

 			
<p>Concentrated Nitric Acid (70%)  <math>\text{HNO}_3</math>  Molecular mass: 63.0  ICSC # 0183  CAS # 7697-37-2  RTECS # <a href="#">QU5775000</a>  UN # 2031  EC # 007-004-00-1  October 10, 2006 Validated</p>			
			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible but enhances combustion of other substances. Gives off irritating or toxic fumes (or gases) in a fire. Heating will cause rise in pressure with risk of bursting.	NO contact with flammable substances. NO contact with combustibles or organic chemicals.	In case of fire in the surroundings: NO foam .
<b>EXPLOSION</b>	Risk of fire and explosion on contact with many common organic compounds.		In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		<b>AVOID ALL CONTACT!</b>	<b>IN ALL CASES CONSULT A DOCTOR!</b>
<b>•INHALATION</b>	Burning sensation. Cough. Laboured breathing. Shortness of breath. Sore throat. Symptoms may be delayed (see Notes).	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention.
<b>•SKIN</b>	Serious skin burns. Pain. Yellow discolouration.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
<b>•EYES</b>	Redness. Pain. Burns .	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.
<b>•INGESTION</b>	Sore throat. Abdominal pain. Burning sensation in the throat and chest. Shock or collapse. Vomiting. corrosive; 20109000	Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give one or two glasses of water to drink. Rest. Refer for medical attention.
<b>SPILLAGE DISPOSAL</b>		<b>STORAGE</b>	

		PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Collect leaking liquid in sealable containers. Cautiously neutralize remainder with sodium carbonate. Then wash away with plenty of water. Do NOT absorb in saw-dust or other combustible absorbents.	Separated from combustible and reducing substances, bases, organics food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: B O symbol C symbol R: 8-35 S: 1/2-23-26-36-45 UN Hazard Class: 8 UN Subsidiary Risks: 5.1 UN Packing Group: I Signal: Danger Corr-Skull-Health haz May be corrosive to metals Fatal if swallowed Causes severe skin burns and eye damage Causes damage to respiratory tract if inhaled Causes damage to digestive tract if swallowed Causes damage to respiratory tract and teeth through prolonged or repeated exposure if inhaled
SEE IMPORTANT INFORMATION ON BACK		
<p><b>ICSC: 0183</b></p> <p>Prepared in the context of cooperation between the International Programme on Chemical Safety &amp; the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>		

## International Chemical Safety Cards

### NITRIC ACID

ICSC: 0183

I M P O R T A N T	<b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS TO YELLOW LIQUID , WITH PUNGENT ODOUR.	<b>ROUTES OF EXPOSURE:</b> Serious local effects by all routes of exposure.
	<b>PHYSICAL DANGERS:</b>	<b>INHALATION RISK:</b> A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.
	<b>CHEMICAL DANGERS:</b> The substance decomposes on warming producing nitrogen oxides. The substance is a strong oxidant and reacts violently with combustible and reducing materials, e.g., turpentine, charcoal, alcohol. The substance is a strong acid, it reacts violently with bases and is corrosive to metals .	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is corrosive to the eyes, the skin and the respiratory tract. Corrosive on ingestion. Inhalation may cause lung oedema (see Notes). The effects may be delayed (See Notes).
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 2 ppm as TWA, 4 ppm as STEL;	<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b>

<p><b>D</b></p> <p><b>A</b></p> <p><b>T</b></p> <p><b>A</b></p>	<p>(ACGIH 2006).            MAK: Iib (not established but data is available) (DFG 2008).            OSHA PEL<sup>†</sup>: TWA 2 ppm (5 mg/m<sup>3</sup>)            NIOSH REL: TWA 2 ppm (5 mg/m<sup>3</sup>) ST 4 ppm (10 mg/m<sup>3</sup>)            NIOSH IDLH: 25 ppm See: <a href="#">7697372</a></p> <p>Lungs may be affected by repeated or prolonged exposure to the vapour. The substance may have effects on the teeth , resulting in teeth erosion.</p>
<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 121°C            Melting point: -41.6°C            Relative density (water = 1): 1.4            Solubility in water: miscible</p> <p>Vapour pressure, kPa at 20°C: 6.4            Relative vapour density (air = 1): 2.2            Relative density of the vapour/air-mixture at 20°C (air = 1): 1.07            Octanol/water partition coefficient as log Pow: -0.21</p>
<p><b>ENVIRONMENTAL DATA</b></p>	
<p><b>NOTES</b></p>	
<p>Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of lung oedema do not become manifest until a few hours or even a few days have passed and they are aggravated by physical effort.</p> <p>Transport Emergency Card: TEC (R)-80S2031-I            NFPA Code: H 4; F 0; R 0; OX</p>	
<p><b>ADDITIONAL INFORMATION</b></p>	
<p><b>ICSC: 0183</b> <span style="float: right;"><b>NITRIC ACID</b></span></p> <p style="text-align: center;">(C) IPCS, CEC, 1994</p>	
<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>

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**APPENDIX C**  
**INCIDENT REPORTING PROCEDURE**

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# GUIDANCE FOR REPORTING A WORK INJURY OR ILLNESS

## 1. NOTIFICATION OF INCIDENT (NOI)

- The employee's manager, supervisor or safety officer is responsible for internal incident reporting via NOITrack as well as external reporting to Weston's WC carrier. Contact Risk Management (RMD) @ 610.701.3667 or 610.701.3046 if there are questions concerning these procedures.
- All work injuries, illnesses and fatalities are to be submitted in NOITrack within 24 hours. This is the initial written record.  
(Fields in NOITrack marked with a red asterisk\* are required to submit a new NOI).
- Additional details, investigation, basic and root cause(s) and any corrective actions are to be added after the initial facts have been submitted.
- Work-related incidents that involve serious medical conditions, questionable incidents, or other cases may also be verbally reported to the Risk Management Department (RMD) for guidance prior to submission in NOITrack.
- NOITrack is available on the RMD page at the following link:  
<http://asweb/NOITrack/IncidentInfo.aspx>  
The system can also be accessed remotely via the WIP.
- If no internet connection is available, the employee's project manager, supervisor safety officer can contact someone at his or her office to key in the required information.

## 2. REPORTING TO WESTON INSURANCE CARRIER

- Weston's workers' compensation carrier is Liberty Mutual Ins. Co. All work incidents with medical treatment, time away from work or job restrictions, as well as incidents that require assistance with investigation or claim management are to be reported to Liberty Mutual.
- The preferred method is to use Liberty Mutual's on-line system. The link and detailed instructions for on-line reporting are available in the Claim Reporting and Guidance section of the RMD page on the Portal. If no internet connection is available Liberty Mutual's 24-Hr reporting number is **800. 951.3200**.

Information required when reporting a claim includes the employee's name, contact information, date of birth, date of hire and the basic facts such as the incident date, time, location, and the nature of the injury or complaints.

The safety officer or manager are not to obtain or provide personal information such as the employee's social security number, marital status, or dependant information which can be provided directly by the employee.

- Any requests for wage information are to be addressed to Lisa Friday in Human Resources (HR).

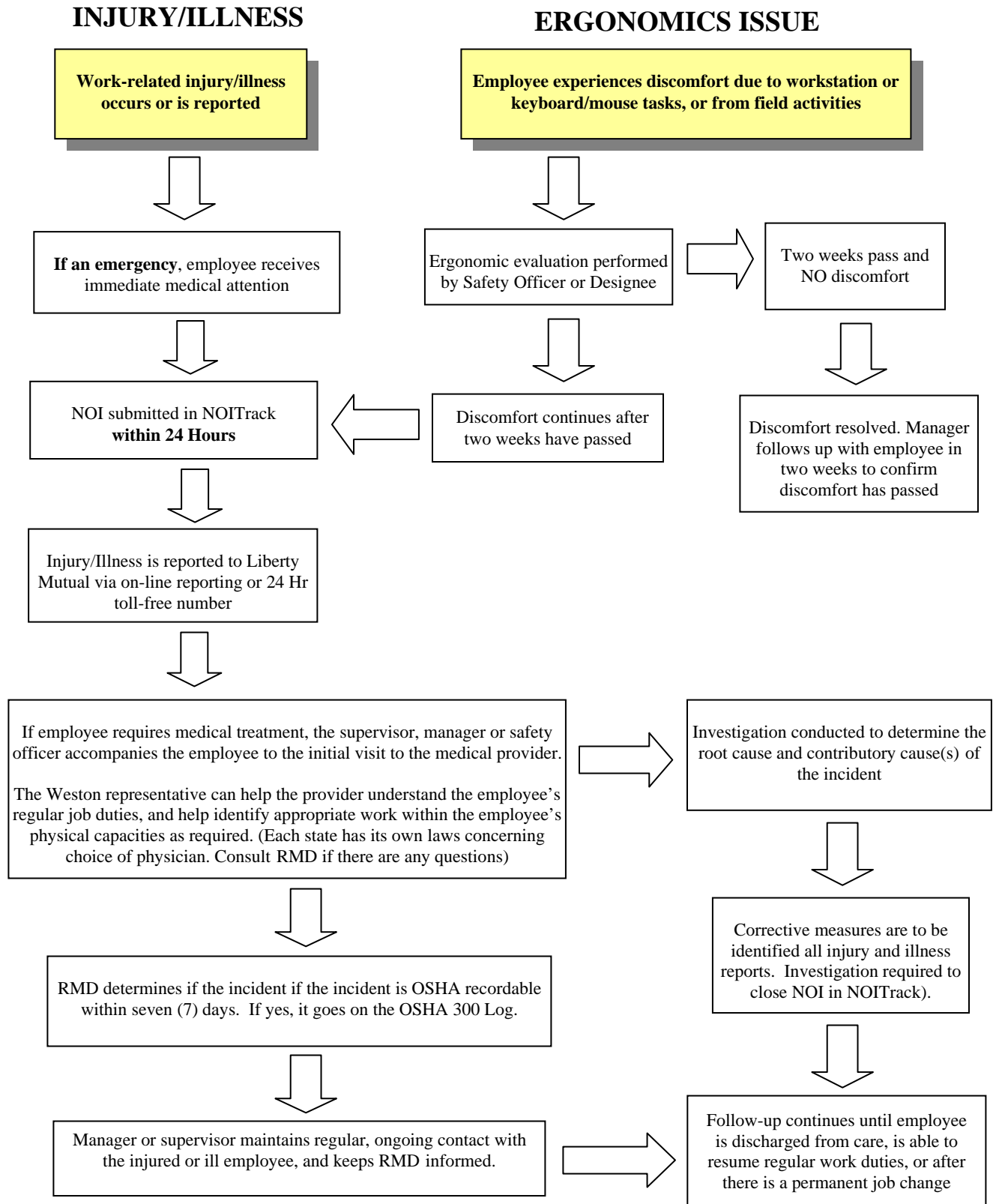
## **GUIDANCE FOR REPORTING A WORK INJURY OR ILLNESS**

- As appropriate, Liberty Mutual will contact the employee, his or her supervisor, and the medical provider as part of their investigation.
- Liberty Mutual's claims adjuster will provide guidance to the local Weston contact, as well as to the employee concerning what to expect during the claim process, and how medical care will be coordinated.

### **3. OTHER REPORTING REQUIREMENTS**

- All OSHA recordable incidents also require completion of an OSHA Form 301. The form is available on the RMD page at the following link:  
<http://westonportal/C1/Risk%20Management/FORMS/Blank%20OSHA301.xls>
- Some cases may also result in additional investigation and documentation concerning the root cause(s) and the corrective action(s). This investigation and any additional documentation will be coordinated through the employee's manager, RMD, and others as appropriate.
- All recordable illnesses or injuries must be recorded on the OSHA 300 Log within seven calendar days of receiving information that the injury occurred.
- At the close of each year, the OSHA 300A Summary will be signed by a company official.
- The annual OSHA 300A summary will be posted in a place visible to employees in each Weston office location. This summary will be posted from February 1st through April 30<sup>th</sup> in accordance with OSHA requirements.
- All recordkeeping forms will be maintained for for a minimum of 5 years.

**Figure 1 – Typical Incident Reporting Procedures**



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**APPENDIX D**  
**OSHA POSTER**

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# Job Safety and Health

## It's the law!



### EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

### EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

**This free poster available from OSHA –  
The Best Resource for Safety and Health**



Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

**1-800-321-OSHA (6742)**

[www.osha.gov](http://www.osha.gov)

OSHA 3165-02 2012R



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**APPENDIX E**  
**BBS – BEST PRACTICES EHS FIELD REVIEW**

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## BBS - BEST PRACTICES EHS FIELD REVIEW

**Site Name:** \_\_\_\_\_ **WO #:** \_\_\_\_\_

**Location:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Field Activities Began:** \_\_\_\_\_

**Name of Designated, Qualified Field Safety Officer On-Site:** \_\_\_\_\_

**DESCRIPTION OF FIELD ACTIVITIES:** Check one

- ☐ **Drilling/Soil Sampling**     ☐ **Groundwater Sampling**     ☐ **Air Sampling**     ☐ **IH Sampling**  
☐ **Test Pits/Trenching**     ☐ **UST Removal**     ☐ **Remediation**     ☐ **Vertical Construction**  
☐ **Demolition**     ☐ **Fuels**     ☐ **MEC\UXO\DDM**     ☐ **Recon**  
☐ **Other:** \_\_\_\_\_

## BEHAVIOR-BASED SAFETY (BBS) PROGRAM ELEMENTS

Item No.	Yes	No	Element
1			All WESTON personnel on-site have received BBS orientation.
2			Weston's "Safety Vision" has been communicated to all project team members.
3a			Project has SMART safety goals. <input type="checkbox"/> Field activities <input type="checkbox"/> Vehicle safety <input type="checkbox"/> Other <div>If yes, list:</div>
3b			SMART goals are documented and communicated to field team, including contractors.
4			The client has a BBS program to which Weston must adhere.
5			Baseline safety data exists for the scheduled work tasks/activities.
6			Targeted behaviors are identified for observation during the field audit. <div>If yes, list:</div>
7			Health and Safety Plan (HASP) posted on-site and orientation given to each person.
8			Initial HASP meeting held and documented before work began.
9			Daily EHS briefings identify the day's tasks and related potential unsafe behaviors.
10			Daily EHS briefings are interactive.
11			Daily EHS Meetings are conducted by: <input type="checkbox"/> SM <input type="checkbox"/> FSO <input type="checkbox"/> Other (Identify): _____
12			Site personnel are provided with additional training or support to complete tasks safely.
13			Question and answer time is available to all site personnel.
14			A formal observation program is in place (client-specific). Observations are documented. If yes, observations are performed by: _____
15			An informal observation program is in place. Observations are documented. If yes, observations are performed by: _____ Type: <input type="checkbox"/> Targeted behavior checklist – corporate <input type="checkbox"/> Site-specific <input type="checkbox"/> Observed actively caring behaviors
16			Feedback mechanisms are in place. <div>If yes, identify mechanisms:</div>
17			The field team leader or designee recognizes and corrects unsafe behaviors in the field.
18			The field team leader shows commitment to the Actively Caring concept and encouragement of Actively Caring behaviors among team members.
19a			The Short Service Employee (SSE) Policy is followed for anyone with Weston for 6 months or less or in current position for 6 months or less.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
19b			A mentor is assigned to the SSE.
19c			The SSE is designated through use of: _____ (e.g., specific colored hat, badge/sticker)
19d			Site team consists of minimum number of SSEs.
Comments/Additional Information – Best Practices Observed:			

### CERTIFICATION OF PERSONNEL

Item No.	Yes	No	Element
1a			Site is subject to HAZWOPER Regulations
1b			If yes, all personnel on-site have current HAZWOPER training.
1c			If (1a) is yes, all personnel on-site have current HAZWOPER medical.
2			Site requires respirator use. If yes, all personnel on site are: <div style="display: flex; justify-content: space-around;"> <input type="checkbox"/> medically qualified for respirator use           <input type="checkbox"/> trained for respirator use         </div> <input type="checkbox"/> fit-tested for respirators to be used
3a			Site/client requires other standard specific medical certification. If yes, specify requirement(s):
3b			Site/client requires substance-specific medical. If yes, list substance(s):
3c			Site/client requires drug and alcohol testing.
3d			Physical capability medical required. If yes, indicate type: <input type="checkbox"/> General physical capability <input type="checkbox"/> Equipment/vehicle operation <input type="checkbox"/> Other: _____
4			Site requires special supervisor training and/or certification. If yes, check requirement: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> HAZWOPER supervisor training  <input type="checkbox"/> Construction 30 hour course  <input type="checkbox"/> Construction site manager's safety course           </div> <div> <input type="checkbox"/> Asbestos abatement  <input type="checkbox"/> Lead Abatement  <input type="checkbox"/> Competent person. List type(s):  <input type="checkbox"/> Qualified person. List type(s):           </div> </div>
Comments/Additional Information:			

### MEDICAL AND FIRST AID

Item No.	Yes	No	Element
1			First-aid kits accessible and identified.
2			Emergency eye/safety washes available. <input type="checkbox"/> ANSI compliance required.
3			First-aid kits and eyewash capabilities inspected weekly and documented (for site projects greater than 1 week in duration).
4			At least two first-aid/CPR-trained persons are on-site at all times when working.
Comments/Additional Information:			

## BBS - BEST PRACTICES EHS FIELD REVIEW

### EMERGENCY ACTION PLANS

Item No.	Yes	No	Element
1			Emergency Action Plan (EAP) posted on-site.
2			EAP orientation provided.
3			Emergency telephone numbers posted.
4			Emergency routes posted. <input type="checkbox"/> Map <input type="checkbox"/> Written Directions.
5			Emergency plan and signals reviewed with all persons.
Comments/Additional Information:			

### HAZARD COMMUNICATION

Item No.	Yes	No	Element
1			A site-specific HAZCOM Plan is in effect and up to date.
2			A chemical inventory and MSDSs are available. Where?
3			Employees trained in the HAZCOM Plan and chemical hazards.
4			100% compliance with HAZCOM observed.
5			Coaching on HAZCOM observed.
Comments/Additional Information:			

### PERSONAL PROTECTION

Item No.	Yes	No	Element
1			PPE Plan has been verified by a Qualified person.
2			All PPE meets applicable ANSI/OSHA/EPA criteria.
3			Hard hat, eye, hearing, foot and other PPE areas are defined and signs in place.
4			Levels of protection (LOP) are established.
5			Site control zones (Exclusion, CRZ, Support) are indicated clearly.
6			All employees know their LOP scheme.
7			OSHA respirator program in place.
8			Employees fit tested: <input type="checkbox"/> QLFT <input type="checkbox"/> QNFT <input type="checkbox"/> On-site <input type="checkbox"/> Current
9			PPE inspected and checked before use.
10			PPE stored properly.
11			Defective equipment tagged out.
12			Sufficient quantities of equipment available.
13			Monitoring Instruments Plan in place and communicated.
14			Instruments maintained and calibrated.
15			Maintenance & Calibration logs up to date.
16			Flotation devices worn when working on or over water.
17			PPE use 100% safe.
18			PPE coaching observed.
Comments/Additional Information:			

## BBS - BEST PRACTICES EHS FIELD REVIEW

### DECONTAMINATION

Item No.	Yes	No	Element
1			Decontamination system set up on-site.
2			Decontamination system used according to safety plan.
3			Contamination reduction corridor clearly delineated in the CRZ.
4			Appropriate waste receptacles available for all waste.
5			Receptacles properly closed at end of day.
6			All decon liquids properly contained and disposed.
7			All wastes disposed of according to approved plan.
8			All personnel received decontamination training.
9			All reusable personal protective gear deconned and disinfected at least daily.
10			Decontamination process 100% followed.
11			Decontamination coaching observed.
Comments/Additional Information:			

### HIGHWAY VEHICLE DRIVING

Item No.	Yes	No	Element
1			Highway vehicle driving addressed in HASP.
2			Highway vehicle driving regularly addressed in safety meetings.
3			Fatigue Management policy discussed with all site workers.
4			Hands-free cell phone use only.
5			All cell phone/radio use limited while driving.
6			100% safe driving observed.
7			Safe driving coaching observed.
8			Journey Management Plan in place.
Comments/Additional Information:			

### WORKING AT ELEVATION

Item No.	Yes	No	Element
1			Ladders are used 100% safely.
2			Ladders used are appropriate for work performed.
3			Portable ladders are inspected before use.
4			Portable ladders are secured from falling.
5			Fixed ladders are inspected for structural integrity.
6			Coaching on ladder use observed.
7			Scaffolds are set up and dismantled under supervision of a competent person.
8			Scaffolding is inspected daily.
9			Scaffold inspections are documented.
10			All site personnel are trained to use scaffolding safely.
11			Scaffolding is used 100% safely.
12			Coaching on safe scaffold use observed.
13			Only qualified persons operate aerial or scissor lifts.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
14			Personnel working at elevation in aerial or scissor lifts are protected from falling by fall limiting or arrest systems as required by regulation or manufacturers.
15			Aerial or scissor lifts are moved while workers are elevated only if permitted by manufacturers.
16			Travel routes for aerial or scissor lifts are inspected for impediments prior to moving.
17			Aerial and scissor lifts are inspected prior to each shift.
18			Aerial and scissor lifts are used 100% safely.
19			Coaching in safe use of aerial and scissor lifts observed.
20			The hierarchy of controls (elimination, substitution, engineering, administrative) is considered prior to performing work at elevation where reliance is placed on fall limiting or fall arresting system.
21			Fall prevention plans are developed by a competent person.
22			Horizontal lifelines are installed by qualified persons.
23			Fall prevention plans include plans for rescue.
24			Fall limiting and arrest equipment is inspected prior to use.
25			Fall limiting and arrest equipment is worn properly.
26			Anchor points are designed and used properly.
27			100% safe use of fall arrest and limiting systems.
28			Coaching is observed on use of fall arrest and limiting systems.
Comments/Additional Information:			

### STRUCK-BY HAZARDS

Item No.	Yes	No	Element
1			Struck-by hazards are identified and addressed in the HASP.
2			Struck-by hazards are addressed in daily safety meetings.
3			High visibility vests are worn by all personnel working in areas where moving equipment is in use and along roadways.
4			A written Traffic Control Plan is implemented.
5			Operators and pedestrians are trained to gain eye contact before crossing vehicle travel ways.
6			Vehicles with blind spots are equipped with backup or motion alarms.
7			Qualified spotters are provided for vehicle backing in congested areas.
8			Qualified flaggers are provided where vehicle traffic enters or crosses public roadways.
9			Signs meeting requirements of the MUTCD are used to alert roadway users impacted by vehicles entering, crossing or leaving public roadways.
10			Site speed limits are posted and followed.
11			Traffic routes are established and followed in congested areas.
12			100% safe operation is observed.
13			Coaching for traffic safety is observed.
14			Materials which can fall from above or be blown are secured.
15			Exclusion zones are established around operations which can expel material or objects at velocity.
16			Personnel are not permitted under loads.
17			Personnel are not permitted to cross under conveyors unless guarding is provided.
18			Taglines are used for positioning elevated loads.
19			Lifting equipment operators know not to fly loads over site personnel.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
20			Exclusion zones are established around masonry walls under construction or being demolished.
21			Preformed walls or lift slab concrete is secured during placement.
22			Power tools designed to accommodate guards are equipped with functional guards.
23			When work is being performed overhead, tools not in use are secured or placed in holders.
24			The use of cranks on hand-powered winches or hoists is prohibited unless the hoists or winches are provided with positive self-locking dogs.
25			Hand wheels with exposed spokes, projecting pins, or knobs are not used.
26			Abrasive wheels are provided with safety guards.
27			Abrasive wheels for chop saws are chosen based on material to be cut.
28			Safety clips or retainers are installed and maintained on pneumatic impact tools to prevent dies and tools from being accidentally expelled from the barrel.
29			Safety lashings are provided at connections between tool and hose and at all quick makeup type connections.
30			Only qualified persons operate explosive-actuated tools.
31			Chain saws, torches or other power tools are not used to cut above shoulder height.
32			Powered nailers have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.
33			Contact trip devices or triggers are not secured in an "on" position.
34			Workers using tools are positioned so work of one does not adversely affect others.
35			100% safe use of tools observed.
36			Coaching on tool use observed.
Comments/Additional Information:			

### CAUGHT -IN HAZARDS

Item No.	Yes	No	Element
1			Caught-in hazards are identified and addressed in the HASP.
2			Caught-in hazards are addressed in daily safety meetings.
3			Pinch point, power drives, belts, etc. are guarded.
4			Lockout-tagout (LOTO) used when performing maintenance.
5			All site personnel trained in LOTO Program.
6			100% Safe LOTO procedures observed.
7			Coaching on LOTO observed.
8			A competent person for excavation is on-site when excavation is performed.
9			Utility check performed, reconfirmed and documented before excavation or drilling per FLD 34.
10			At least one utility competent person is on-site.
11			Competent person determines appropriate protection to prevent excavation cave in.
12			Guardrails or fences placed around excavations near walkways or roads.
13			Excavation locations lighted/or otherwise made visible at night.
14			Ladders or ramps are provided to access and exit trenches more than 4 feet deep and within 25 ft of any entrance.
15			All excavated material, personnel, and heavy equipment are at least 24-inches from the edge of all trenches.
16			100% safe utility mark, excavation, and trenching observed
17			Coaching on safe utility mark, excavation and trenching observed.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
18			Confined space entry (CSE) permit procedure in place and communicated to all.
19			CSE permit procedure used: <input type="checkbox"/> Pre-entry review <input type="checkbox"/> Safety watch/attendant <input type="checkbox"/> Safety watch protected same as entrants <input type="checkbox"/> Retrieval system <input type="checkbox"/> Appropriate rescue available <input type="checkbox"/> Continuous monitoring for ___%O <sub>2</sub> ___%LEL & TOX: ____, ____, ____, ____
20			CSE employee training documented.
21			100% safe CSE observed.
22			Coaching on CSE observed.
Comments/Additional Information:			

### ELECTRICAL

Item No.	Yes	No	Element
1			Warning signs indicate the presence and location of high voltage equipment, 250 V or greater.
2			Qualified persons only permitted to work within 10 feet of any exposed live electrical conductors.
3			Electrical equipment and wiring properly guarded.
4			Electrical lines, extension cords, and cables guarded and properly maintained.
5			Extension cords kept dry out of puddles and rain.
6			Damaged equipment tagged out.
7			GFCIs used as appropriate.
8			Extension cords are rated for hard or extra hard outdoor use.
9			Underground electrical lines located and indicated per FLD 34.
10a			Arc flash assessments are performed as required.
10b			PPE for arc flash is provided.
10c			PPE for arc flash is appropriate.
11			100% safe electrical work observed.
12			Coaching on safe electrical work observed.
Comments/Additional Information:			

### WALKING AND WORKING SURFACES

Item No.	Yes	No	Element
1			Access ways, stairs, ramps, and ladders free of ice, mud, snow, or debris
2			Mobile offices/labs have fixed stairs and handrails.
3			Work areas kept free of debris and equipment.
4			Material in storage is protected from falling or collapse by effective stacking, blocking, cribbing, etc.
5			Walkways and aisles are kept clear.
6			Materials are not stored on scaffolds or runways in excess of normal placement or in excess of safe load limits.
7			Work areas and means of access are maintained safe and orderly.
8			Tools, materials, extension cords, hoses or debris do not cause tripping or other hazards.
9			Storage and construction-sites are kept free from the accumulation of combustible materials.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
10			Waste materials and rubbish are placed in containers or, if appropriate, in piles.
11			Waste materials are disposed of in accord with applicable local, state, or federal requirements.
12			100% safe walking and working surfaces observed.
13			Coaching on safe walking and working surfaces observed.
Comments/Additional Information:			

### MATERIAL HANDLING

Item No.	Yes	No	Element
1			Mechanical lifting is available and used whenever possible.
2			Employees are trained in and use safe lifting techniques.
3			Repetitive motion tasks are evaluated and addressed in the HASP.
4			Repetitive injury prevention is discussed during indoctrination.
5			Repetitive injury prevention is a regular topic at daily meetings.
6			100% material handling observed.
7			Coaching on safe material handling observed.
Comments/Additional Information:			

### FIRE PREVENTION/PROTECTION

Item No.	Yes	No	Element
1a			Hot Work Checklists completed (FLD 36).
1b			If Hot Work Permit(s) required: <input type="checkbox"/> Permit(s) up to date. <input type="checkbox"/> Closed out permit(s) on file.
2			Smoking restricted to designated area.
3			Fire lanes established, clearly designated, and maintained.
4			Flammable/combustible liquid dispensing transfer systems grounded and bonded.
5			Proper flammable materials storage used.
6a			Fire alarm established.
6b			Workers aware of established fire alarm
7			Fire extinguisher(s) appropriately located.
8			Fire extinguisher(s) appropriate for fire hazard potential.
9			Location and use of fire extinguisher(s) known by all personnel.
10			Fire extinguisher(s) checked before each shift.
11			Fire extinguisher(s) inspected monthly.
12			Fire extinguisher(s) inspected yearly.
13			Combustible materials segregated from ignition sources.
14			Incompatibles segregated.
15			100% fire prevention/protection observed.
16			Coaching on fire prevention/protection observed.
Comments/Additional Information:			

## BBS - BEST PRACTICES EHS FIELD REVIEW

### MOTOR VEHICLES/HEAVY EQUIPMENT

Item No.	Yes	No	Element
1			Highway driving safety addressed in HASP.
2			Drivers assigned to vehicles based on experience and training.
3			Construction equipment inspected before each use. <input type="checkbox"/> Inspections documented. <input type="checkbox"/> Inspection documents on file.
4			Inspection issues identified are corrected.
5			Unsafe equipment tagged out and reported.
6			Certificates on site for operators of equipment requiring licenses or certifications.
7			All safety appliances/guards in place.
8			Equipment shut down for fueling.
9			Construction equipment has back-up alarms or spotters are used if 360° visibility restricted.
10			Loads are secure before transport.
11			Roads and structures inspected for load capacity per vehicle weights.
12			A Traffic Control Plan is in effect.
13			100% safe vehicle and equipment operation observed.
14			Coaching on safe vehicle and equipment operation observed.
Comments/Additional Information:			

### HAND AND POWER TOOLS

Item No.	Yes	No	Element
1			Guards and safety devices in place and used.
2			Tools inspected before each use.
3			Tools tagged out, if defective.
4			Eye protection areas identified and protection worn.
5			Non-sparking tools available.
6			Coaching on safe tool operation observed.
Comments/Additional Information:			

### WELDING AND CUTTING

Item No.	Yes	No	Element
1			Only qualified welders permitted.
2			Hot work permitting system in use.
3			Fire watch provided.
4			Equipment inspected before use.
5			Welding equipment properly grounded.
6			Appropriate PPE worn: <input type="checkbox"/> Proper helmets and shields (including proper tint for UV protection) <input type="checkbox"/> Leathers or other protection from sparks/slag
7			Air sampling/monitoring is performed to assess toxic fume exposure.
8			Adjacent workers protected from welding flash.
9			Oxidizers and fuel cylinders separated by 20 feet or ½ hour fire wall in storage.

## BBS - BEST PRACTICES EHS FIELD REVIEW

Item No.	Yes	No	Element
10			Fuel cylinders secured in upright position.
11			Fire extinguishers present at all welding and cutting operations.
12			100% safe welding and cutting operations observed.
13			Coaching on welding and cutting observed.
Comments/Additional Information:			

### ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PLAN (EPSP)

Item No.	Yes	No	Element
1			Environmental Protection and Sustainability Plan posted.
2			EPSP reviewed as part of site indoctrination.
3			EPSP Checklist used to review Environmental Compliance.
4			100% environmental compliance observed.
5			Coaching on environmental compliance observed.
Comments/Additional Information:			

### MISCELLANEOUS

Item No.	Yes	No	Element
1			Overhead hazards are noted, communicated to all, and labeled as needed.
2			For large construction projects, EHS Inspection (Checklist is used).
3			Copies of contracts with client and sub-contractors are on-site, WESTON's role regarding site health and safety responsibilities are clear in these, and site manager(s) understands.
4			Sub-contractors have received approved copies of their safety plan or have signified their intent to conform to Weston's safety plan.
5			Site managers understand their responsibilities for sub-contractors' conformance with all OSHA and other health and safety requirements
6			Site managers know what to do in the event of an OSHA/agency inspection
7			If warranted based on audit observations, a feedback session was provided to affected employees.
8			
9			
10			
Comments/Additional Information:			

### COMMENTS/FEEDBACK PROVIDED:

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**APPENDIX F**  
**WESTON FIELD OPS**

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## FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

### RELATED FLDs AND OP

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*OP 05-03-008 – Inclement Weather & Business Disruption Policy*

### PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

### Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

### Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

### Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock

when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

### Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

### **Cold, Snow, and Ice**

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

### Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

## **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

### Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the “30-30” Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

## **High Wind and Tornado Safety**

### High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit [weatherbug.com](http://weatherbug.com) or [weather.gov](http://weather.gov) to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator’s manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

## Know the Terminology

### Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

### Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

### High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

### High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

### Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

## Tornados

### What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

### Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

### Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

*When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.*

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

**BE ALERT TO CHANGING WEATHER CONDITIONS**

**HAVE AN EMERGENCY WEATHER PLAN IN PLACE**

**REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY**

**KNOW WHERE TO GO WHEN A TORNADO THREATENS.**

## **FLD 05 HEAT STRESS PREVENTION AND MONITORING**

Heat stress may occur at any time work is performed at elevated temperatures. If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur such as fatigue, irritability, anxiety, and decreased concentration or dexterity, and possibly death. Because heat stress is one of the most common and potentially serious illnesses at field sites, regular monitoring and other preventive measures are vital to ensure worker safety. Wearing chemical protective clothing often decreases natural body heat loss (cooling) and increases the risk of heat stress.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments to see if their medication would impair their ability to handle heat stress.

### **REFERENCES**

OSHA 29 CFR 1910 and 1926

### **RELATED FLDs**

*FLD 02 – Inclement Weather*

*FLD 03 – Hot Processes – Steam, Low Temperature Thermal Treatment Unit, and Transportable Incinerator*

*FLD 08 – Confined Space Entry Program*

*FLD 36 – Welding/Cutting/Brazing/Radiography*

*FLD 37 – Pressure Washers/Sandblasting*

### **PROCEDURE**

#### **Heat Stress Symptoms and Treatment**

##### Heat Rash

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation and is aggravated by chafing clothes. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by showering, resting in a cool place, and allowing the skin to dry.

##### Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

*Treatment* – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of cool potable water or diluted commercial electrolyte solution (e.g., Gatorade, Quench) immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery; however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

### Heat Exhaustion

Heat exhaustion is a state of weakness or exhaustion caused by the loss of fluids from the body. Heat exhaustion is not as dangerous as heat stroke, but if not properly managed in the field it may lead to heat stroke.

*Symptoms* – Pale, clammy, and moist skin, profuse perspiring, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, may feel dizzy, and may be irritable or confused.

*Treatment* – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician. Ensure that the victim is not nauseated or vomiting. If not nauseated or vomiting, give the victim small sips of cool water or diluted electrolyte replenishment solution (one to one dilution with water, or if mixing from powder, double the water added). If this is tolerated, have the victim drink 1 to 2 cups of fluid immediately, and every 20 minutes thereafter until symptoms subside. Seek medical attention at the advice of the consulting physician.

### Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

*Symptoms* – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature (i.e., 104°F or greater as measured with an oral thermometer), rapid respiratory and pulse rate, seizures or convulsions, unconsciousness or coma.

*Treatment* – Immediately call for emergency medical assistance. Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Remove all PPE and as much personal clothing as decency permits. Fan the person while sponging or spraying with cool or tepid water. Apply ice packs (if available) to the back of the neck, armpits, groin area, or behind the knees. Place the victim flat on their back or with head and shoulders slightly elevated. If conscious, and not nauseated or vomiting, the victim may be provided sips of cool water. Do not give the victim coffee, tea, or alcoholic beverages. Emergency medical personnel will take over treatment when they arrive.

## **Recognition and Risk Assessment**

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not

followed or the risk is too great. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

### **Prevention and Protection Programs**

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment (PPE) worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The following recommendations should be followed to prevent heat stress:

- The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. To prevent heat stress symptoms, the individual must ensure replacement of this fluid.
- Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Workers should drink 16 ounces of water before beginning work, and a cup or two at each break period.
- Provide a shaded area for rest breaks. Ensure that adequate shelter is available to protect personnel against heat and direct sunlight. When possible, shade the work area.
- Discourage the intake of caffeinated drinks during working hours.
- Monitor for signs of heat stress.
- Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level.
- If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.
- Acclimate workers to site work conditions by slowly increasing workloads (i.e., do not begin work activities with extremely demanding tasks).
- Rotate shifts of workers who are required to wear impervious clothing in hot weather.
- Encourage workers to wear lightweight, light-colored, loose-fitting clothing.
- In extremely hot weather, conduct field activities in the early morning and evening.
- Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- Good hygienic standards must be maintained by frequent showering and changes of clothing.
- Clothing should be permitted to dry during rest periods.
- Whenever working in the sun, provide employees with sunscreen with both UVA and UVB protection.
- Persons who notice skin problems should immediately consult medical personnel.

## Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division EHS Manager, FSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

**NOTE:** For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

- Measure the air temperature with a standard thermometer.
- Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).
- Calculate the adjusted temperature based on the following formula:  
$$\text{Adjusted Temperature} = \text{Actual Temperature} + 13 \times X \text{ (where } X = \text{sunshine fraction from Table 1)}$$
- Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers for the calculated adjusted temperature.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).

**Table 1. Percent Sunshine Factors  
Heat Stress Prevention and Monitoring**

<b>Percent Sunshine (%)</b>	<b>Cloud Cover</b>	<b>Sunshine fraction</b>
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

**Table 2. Physiological Monitoring Schedule  
Heat Stress Prevention and Monitoring**

<b>Adjusted Temperature</b>	<b>Level D (Permeable clothing)</b>	<b>Level C, B, or A (Nonpermeable clothing)</b>
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

**Example:** Site personnel anticipate wearing level C (impermeable clothing) during site activities. The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

$$\text{Adjusted Temperature (Adj T } ^\circ\text{F)} = \text{Actual Temperature (Amb T } ^\circ\text{F)} + (13 \times \text{sunshine fraction})$$

$$\text{Adj T } ^\circ\text{F} = 80^\circ\text{F} + (13 \times 1.0)$$

$$\text{Adj T } ^\circ\text{F} = 93^\circ\text{F}$$

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 15 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

## FLD 06 COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

### RELATED FLDs

*FLD 02 – Inclement Weather*

*FLD 17 – Diving*

*FLD 19 – Working Over or Near Water*

*FLD 25 – Working at Elevation/Fall Protection*

### GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. Respiration – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. Evaporation – Heat loss from the body by vaporization of water from the skin surface.
3. Conduction – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. Radiation – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. Convection – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body's ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.

4. A worker's predisposing health condition such as cardiovascular disease, diabetes, and hypertension.
5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

## **RECOGNITION AND RISK ASSESSMENT**

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

### **Low Temperature + Wind Speed + Wetness = Injuries and Illness**

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

#### **Frostbite**

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

#### **Hypothermia**

Hypothermia means "low heat" and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air

temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

## **Prevention and Protection**

The following general guidelines are recommended for preventing or minimizing cold stress:

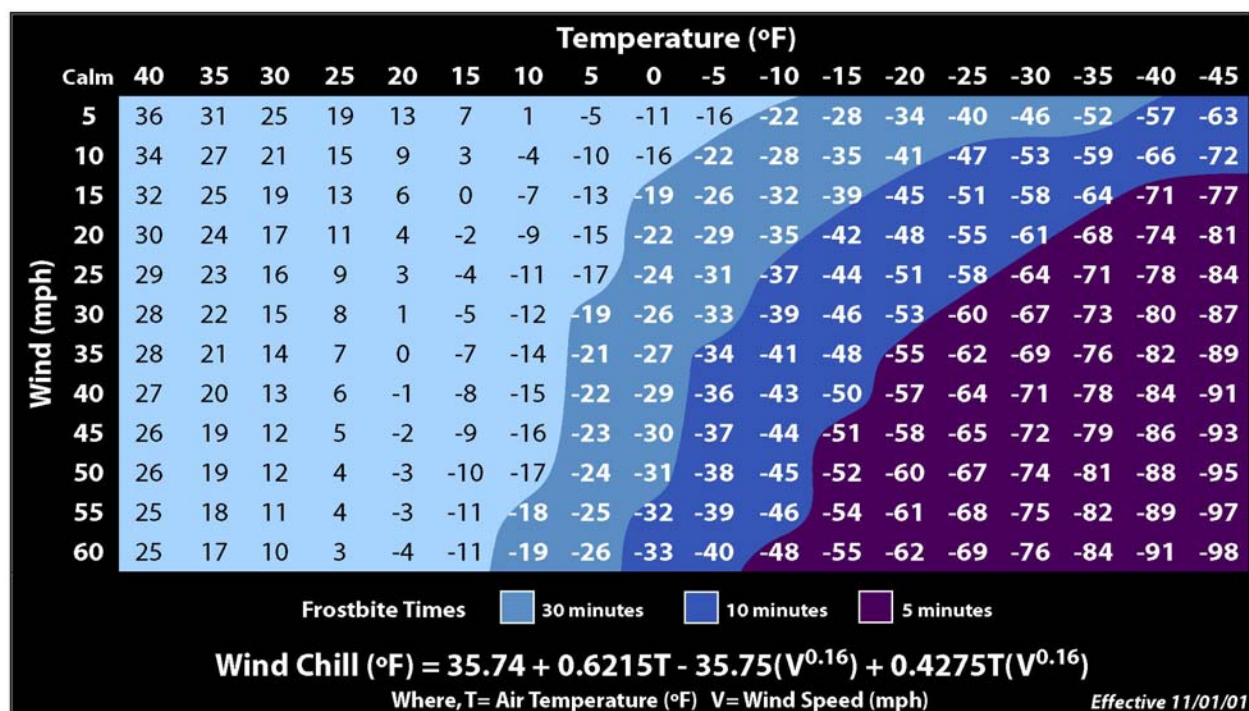
- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.

- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will “breathe” or allow water vapor to escape.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.
- If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
- New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
- Arrange the work in such a way that sitting or standing still for long periods is minimized.
- Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
- Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
  - Proper use of clothing
  - Proper eating and drinking habits
  - Safe work practices
  - Proper rewarming procedures and appropriate first aid treatment
- Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.

## Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

**Table 1. Wind Chill Chart**



NWS/NOAA

**Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts**

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
≥-24°F	Normal	1
-25° to -30°F	75 minutes	2
-31° to -35°F	55 minutes	3
-36° to -40°F	40 minutes	4
-41° to -45°F	30 minutes	5
≤-46°F	Stop work	Stop work

## FLD 10 MANUAL LIFTING AND HANDLING OF HEAVY OBJECTS

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury. Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted. Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

At the project level, the need for manual lifting or handling of heavy objects must be identified as a physical hazard in the planning stages of a project Health and Safety Plan (HASP).

### MANUAL LIFTING

Plan any manual lifting task noting the following:

**Contact hazards.** Check each object before lifting for presence of splinters, splinters, sharp edges or parts, cracks and loose joints, which can result in cuts. Signs of biological hazards, and chemical or radioactive material contamination.

- **Weight of object.** Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
- **Size and shape of object.** Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity.
- **Area in which lifting is to be done.** Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings). Check for pinch points such as other objects close by and ensure there is room for safe lifting.
- **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

**Route to be traveled, if lifting includes carrying.** Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.

### Manual Lifting - Prevention and Protection

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
  - Determine that the object is within the safe weight limit.
  - Check for contact hazards.
  - Walk the intended route of travel to identify and remove slip and fall hazards.
  - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.

- To lift square or rectangular objects:
  - Avoid reaching as you lift.
  - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
  - Keep objects close to the body.
  - Squat in front of the load.
  - Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
  - Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
  - Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting.

If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel

To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **For odd-shaped objects, the only modification needed should be hand-hold position.** When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

## MANUAL HANDLING OF HEAVY OBJECTS

Manual handling of heavy objects, even when not lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not involve lifting, workers can handle heavier objects safely, even those weighing several hundred pounds, if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

### Manual Handling - Prevention and Protection

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible. Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

Objects to be manually handled must be checked for contact hazards before handling, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55-gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

## **FLD 11 ROUGH TERRAIN/ATV USE**

### **RELATED FLDs**

*FLD 02 – Inclement Weather*

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*FLD 22 – Heavy Equipment Operation*

*FLD 47 – Clearing, Grubbing, and Logging Operations*

*FLD 57 – Motor Vehicle Safety*

### **HAZARD**

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

### **RECOGNITION AND RISK ASSESSMENT**

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

### **HAZARD PREVENTION AND PROTECTION PROGRAMS**

#### **Safety on Foot**

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the “buddy system” will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

#### **VEHICLE SAFETY**

Vehicle drivers and passengers will wear seatbelts at all times.

Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

## **Definitions**

**Class I, All-terrain vehicle (ATV):** A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

**Class I, Category G, ATV:** An ATV intended for general recreational and utility use.

**Class I, Category U, ATV:** An ATV intended primarily for utility use.

**Class II, ATV:** A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

**NOTE:** Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

## **ALL TERRAIN VEHICLES (ATVS)**

### **Qualifications**

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

### **Equipment**

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

### **Operation**

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.

## UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer's published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of “Slow Moving Vehicle” emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer’s recommendations.

## **RULES**

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water. The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

## **Transport Loads Safely**

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

### **Climbing or Descending a Hill**

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

### **Riding Through Water**

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.

## **FLD 20 TRAFFIC**

### **RELATED FLDs AND PROGRAMS**

*FLD 02 – Inclement Weather*  
*Occupational Noise and Hearing Conservation Program*

### **PROCEDURE**

Traffic presents hazards in three ways: 1) when site workers are working close to roadways, the potential exists to be hit by oncoming traffic, 2) driving to, from, and on the site poses a potential accident hazard; and 3) increased heavy vehicle traffic may pose risk to the public.

#### **Recognition and Risk Assessment**

In the planning stages of a project and safety plan, the potential for traffic hazards must be considered as physical hazards in the site-specific Health and Safety Plan (HASP).

Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely traffic hazards that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the Site Manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

The conduct of over the road haulers and delivery vehicles when working for WESTON reflects on WESTON. Traffic violations and in particularly accidents involving other vehicles or environmental damage can be associated with WESTON in the minds of the client and community. Over the road haulers used for WESTON work must understand fully WESTON's expectations relative to compliance with traffic laws and the consequences for failure to comply or being in an accident.

#### **Prevention and Protection Program**

Driving safety is to be addressed in each HASP. As a minimum the form in Appendix A is to be used to develop this part of the HASP.

#### **Traffic Control Plan Guide**

The Traffic Control Plan Checklist provided in Appendix B may be used to develop this part of the HASP. Traffic Control Plans may involve two main types of traffic control.

1. Traffic traveling over the public highway system may be driven by regulations at the State or local government level.
2. On-site traffic: While OSHA regulations cover certain aspects related to on-site traffic control there is no specific standard that addresses the issue. The USACE Regulations EM 385-1-1, reference use of the Manual on Uniform Traffic Control Devices (MUTCD). THE USACE also has specific requirements for haul road construction (provided as Appendix C) that are required for WESTON USACE jobs. For other than USACE jobs, these requirements should be considered best practices.

Requirements for Traffic Control Plans are often found in Construction Contract Specifications.

## State, Local Government, and Municipal Traffic Control Requirements

The addition of traffic, particularly heavy vehicles, due to a construction project may require compliance with State, County, Township, and Municipal Regulations. These regulations must be considered when completing the Traffic Control Plan Checklist.

If vehicles will be crossing or affecting traffic (slowing to turn or pulling out into traffic) traffic controls may be needed based on general requirements adopted by the agency with authority. These are often based on the MUTCD. There are 45 States which have adopted the MUTCD. Seven States which have not yet formally adopted the MUTCD include: the district of Columbia, Indiana, Kentucky, Pennsylvania (uses the 2003 edition with supplemental requirements), and Tennessee, New York, and Texas (have their own versions).

- Traffic control requirements may include the following:
- Use of signs with specified sizes, color, wording, and distances from the turn; or access point to requiring “flaggers.” **Note:** More states now require training and/or certification of “flaggers.”
- If traffic lanes will be blocked or diverted, there are additional requirements for signs, barriers, or cones. Consideration must be given to protecting persons working along side of the road, such as by use of barriers.
- Specific travel routes and specified times of operation may be required by some agencies.
- The use of “Jack” brakes or “retarder” brakes may be prohibited in some municipalities due to the noise.
- Permits for encroaching on or making new access-ways to highways may be required.

## On-site Traffic Control Considerations

### Personally Owned Vehicle (POV) Parking

One area of traffic control which is not often addressed in plans, but which has resulted in several accidents on WESTON Projects is in POV parking areas. Particularly when space is tight or at a premium, any open space available for parking of POV’s becomes prime space for materials lay down or parking of construction equipment either when not in use, following delivery, or awaiting pick-up by vendors. Another factor that often affects POV parking areas is influx of trades contractors as the project moves from earthwork to demolition or construction. Planning is necessary to keep the POV parking area from becoming an area too crowded to allow safe parking space entry and exit.

### Client Requirements

Industrial and government clients may also have traffic control requirements which must be incorporated into Traffic Control Plans.

### On-Site Haul Vehicle Routes and Controls

Two scenarios that need to be considered relative to on-site haul routes include routes for over-the-road trucks and routes for off-road haulers, such as articulated dumps. Common concerns include, collisions, backing, road surface, inclement weather, congestion, overturning due to hung up load or unbalanced load, overturning due to road surface or speed, and contact with overhead utilities and structures.

Collisions and backing incidents are ideally avoided by creating loops with all traffic traveling in one direction. If backing is necessary, minimize the distance. Build aprons of sufficient size to allow maneuvering. Control backing with spotters or flaggers. Establish a set of standard hand signals that all spotters use. Spotters must never back more than one vehicle at a time. Spotters must be highly visible and positioned so that in the event of an overturn, they are sufficiently far from the vehicle so that they will not be struck. Spotters must also be trained to look out for overhead obstacles, unbalanced loads, unstable terrain, and load hang-ups, and to prohibit dump trucks from driving more than the distance required to dump a load with the bed raised.

To avoid turnover, roadways must be maintained to provide solid surfaces for travel by the largest anticipated vehicles. Dumping areas must also be sound. Most over the road dump truck turnovers are due to the rear wheels settling to one side or the other while raising the loaded bed to dump, or when parts of loads hang up near the front of the dump body. On semi-type dump trucks, if possible specify reinforced dump beds, and if high wind conditions, 15 plus miles per hour, occur consider stopping dumping. If winds exceed 25 mph, halt dumping.

### **Routes for Over-the-Road Trucks**

Over-the-road dump trucks are not designed for off-road travel. The use of board roads is a best practice to consider if soil cannot be compacted sufficiently to provide a firm surface or if schedule is tight and rain or other inclement weather would make dirt or stone roads unusable. Board roads can provide solid footing for over-the-highway trucks and can easily be reconfigured when dumping areas change. Board roads sections can also be used to establish turn-around and apron areas.

If board roads are not used, roads must constantly be maintained and a procedure for dealing safely with stuck trucks must be developed.

### **Routes for Off-Road Haulers**

Off-road trucks are designed for travel on less -maintained roads, however past experience has shown that incidents involving off-road trucks include: bed tip-over and injury to drivers from bouncing around in the cab. One factor that has resulted in tip-over is ruts in roads that are either of different depths or in other ways uneven or not directly perpendicular to the roadway. This results in the truck body twisting as designed, however, when the momentum of the load shifts sideways the bed tips over. A second factor resulting in tip-over is speed. A third factor is driving across slope or turning on grade.

Bed tip-over may be prevented by diligent maintenance of roads and posting and enforcing speed limits based on the vehicles capabilities. See Appendix C for USACE requirements (or for use as best practices).

Injuries to operators from bouncing may be prevented by strict enforcement of use of seat belts and hard hats.

### **Construction Equipment and Smaller Vehicles on Site**

Vehicle damage incidents may occur where a pickup truck or other small vehicle is left along a roadway or in the actual construction zone and it is struck by a piece of construction equipment because it was in the equipment's blind spot or swing radius.

Prevention of these types of incident includes: limiting use of smaller vehicles in areas where construction equipment is operating and communication between operators. Another preventive measure is to place strobe type lights on the smaller vehicles to increase awareness of their presence.

## Pedestrians/Workers on Foot

Construction workers working around construction equipment may be struck by the construction equipment. Such incidents usually result in fatalities. Communication is critical between construction workers and others on the ground working around construction equipment and the operators.

The following are practices to protect workers on foot in heavy equipment operating areas:

- Workers on foot should be kept out of areas where heavy equipment frequently moves and operates. Plan to have workers in the area *before* activities requiring heavy equipment start or *after* they have ended.
- When workers on foot and equipment must both share the same area, each should work in their designated space with some form of barrier erected to create a physical separation.
- Where workers on foot share the site with moving equipment, especially reversing equipment, everyone should be aware of the need for a signaler whenever the view of the intended path of travel is obstructed or workers are in danger. Signs should be posted on site to remind equipment operators and workers that a signaler must be used when traveling in reverse or any other direction affording the operator only limited visibility.

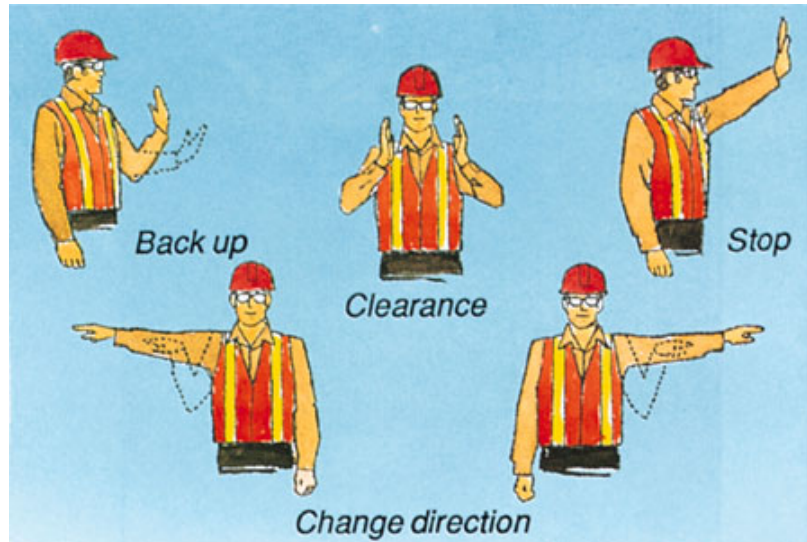
### Signaler

Where there is a danger to workers from moving vehicles, particularly vehicles operating in reverse, a signaler must be used to safely direct traffic. The signaler must be trained in the on-site signals to be used, positioning, visibility, communication, and other points outlined in the following sections.

A signaler must wear personal protective equipment such as approved boots, hard hat, and reflective fluorescent vest.



**Part-time Signaler** Where a full-time signaler is not required because vehicle movement is limited, a worker must be designated as part-time signaler and accordingly notify all vehicles entering the work zone. Operators must understand that, where visibility is obstructed, no equipment will move without the signaler's assistance. The part-time signaler does regular work until a vehicle enters the work zone and requires assistance. Then the worker stops work to direct equipment. While signaling, the worker should not be doing any other work. Equipment operators must stop their vehicle at once if the signaler is not paying attention to the task at hand. Once signaling is finished, the worker should continue regular work until required to signal again.



Signalers must stand outside the equipment's path of travel in case they trip and fall. When directing on-site traffic, the signaler must have a clear view of the intended path and must be fully visible to drivers to ensure that signals are being received. The signaler should stand squarely in the operator's mirror view, thereby ensuring maximum visibility.

For radio communication, equipment must be in good operating condition and batteries fully charged. When visual signals are used, they must be clear. Use the entire arm to indicate directional changes, not just fingers.

**Workers should be instructed in the proper methods**

### Training

Site personnel should be trained to recognize blind spots, the areas around every vehicle that are partly or completely invisible to the operator or driver, even with the help of mirrors. Specific training can then focus on the following points:

### Workers on Foot

- Know how to work safely around trucks and operating equipment.
- Understand the effect of blind spots around vehicles and equipment.
- Avoid entering or standing in blind spots.
- Make eye contact with the driver or operator before approaching equipment.
- Signal intentions to the driver or operator.
- Where available, use separate access rather than vehicle ramps to enter and exit the site.
- Avoid standing and talking near vehicle paths, grading operations, and other activities where heavy equipment is moving back and forth.
- Advise fellow workers whenever they may be in a hazardous location.

## Drivers and Operators

- Always obey the signaler or spotter. If more than one person is signaling, stop your vehicle and determine which one to obey.
- Remain in the cab if possible in areas where other equipment is likely to be backing up or may not see you because of blind spots.
- Make sure all mirrors are intact, functional, and properly adjusted for the best view.
- If you must leave your vehicle, you must have on safety shoes, hard hat, and safety glasses.
- Climbing on truck bodies to check loads must be via designed and well constructed ladders.
- Prior to climbing, to check loads, loading or unloading must stop and driver must verify equipment operators understand the driver intends to climb on the body.
- After leaving your equipment for any period of time, do a circle check when you return. Walk around the equipment to ensure the area is clear before you get into the cab and start moving.
- Stop the vehicle at once when a spotter, worker, or anyone else disappears from view.
- Other than needed to dump your load, traveling with dump beds raised is prohibited.
- Empty dump beds must be fully lowered prior to pulling away from unloading areas.

## Signalers

- Stay alert to recognize and deal with dangerous situations.
- Know and use the standard signals for on-site traffic.
- Wear reflective fluorescent vest and bright hard hat for high visibility.
- Understand the maneuvering limitations of vehicles and equipment.
- Know driver and operator blind spots.
- Stand where you can see and be seen by the driver or operator.
- Make eye contact with driver or operator before signaling or changing location.
- Never become distracted by other work when directing equipment.
- Notify drivers or operators that you are the designated signaler and that they must not maneuver without your guidance where their view is obstructed.
- Observe dump beds for hung up loads.
- Signalers are responsible for alerting operators of over head utilities or obstructions.
- Enforce the “no driving with beds raised” rule.

## **REFERENCES**

USACE Regulations, EM 385-1-1, Safety and Health Requirements, 3 November 2003

Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), December 2007 (2003 Edition with Revisions 1 and 2)

## APPENDIX A VEHICLE USE ASSESSMENT AND SELECTION

Driving is one of the most hazardous and frequent activities for WESTON employees. The most appropriate type of vehicle (s) authorized for use on this project is/are:

1. A large vehicle for transporting sampling equipment
- 2.
- 3.
- 4.

The following team member's qualifications and experience in driving these vehicles was evaluated and found to be acceptable (indicate the vehicle type(s) number next to each employee's name)

1. All Weston personnel can drive the sampling vehicles.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

The project site was evaluated and a **Traffic Control Plan** ☐ is required ☐ is not required.

If required, the **Traffic Control Plan** can be found in Appendix \_\_\_\_\_ of this HASP.

## APPENDIX B TRAFFIC CONTROL PLAN CHECKLIST

### State, Local Government and Municipal Traffic Control Requirements

Yes	No	
		Will the project result in an increase of traffic volume or the type of vehicles that will be regulated by a government entity?
		Are there requirements for specific travel routes within the boundaries of any government jurisdiction?
		If so, are maps and descriptions provided to drivers along with clear communication of consequences of failing to follow these routes?
		Is there a system in place for communicating routes to vendors beside the vehicle operators involved in day to day material transport?
		Are there restrictions on when traffic is permitted?
		If so, is there clear communication of these requirements to all drivers and of consequences of failing to follow these routes?
		Is there a system in place for communicating these requirements to vendors beside the vehicle operators involved in day to day material transport?
		Are there prohibitions on types of brakes?
		Will signs be required?
		Is color, wording, size and spacing of signs specified?
		Are “flaggers” required?
		Must “flaggers” be certified or trained?
		Will barriers or other protection be required to protect workers along roadways?
		Are permits required for encroaching on, access to or providing new access to a highway?
		Have over-the-road drivers been informed that they are expected to obey all traffic laws while traveling to and from the WESTON site on WESTON business and that if WESTON learns of a traffic violation being issued or an accident occurs that that can result in prohibition of the driver being used for WESTON related work?

### Personally Owned Vehicle (POV) Parking

Yes	No	
		Is there ample space for POV parking with safe access and exit to streets or highways?
		Are there separate areas provided for POV parking, equipment/materials lay-down and construction equipment parking?
		Are POV parking areas, equipment/material lay-down areas and construction equipment areas part of regular EHS inspections and checklists?

## On site Traffic Control

Yes	No	
		Are routes established with all traffic traveling in one direction?
		If backing is necessary, is the distance minimized?
		Are aprons for turn around or dumping of sufficient size to allow maneuvering?
		Are dumping areas of sufficient soundness to support the largest anticipated loaded dump vehicles?
		Are spotters or flaggers used to control backing?
		Are spotters trained?
		Is a set of standard hand signals established that all spotters use?
		Are spotters prohibited from directing more than one vehicle at a time?
		Are spotters highly visible and positioned so that in the event of an overturn, they are sufficiently far from the vehicle so that they will not to be struck?
		Do spotters understand their responsibility to look out for overhead obstacles, unbalanced loads, unstable terrain, load hang-ups, and to prohibit dump trucks from driving more that the distance required to dump a load with the bed raised?
		Are roadways maintained to provide solid surfaces without ruts for travel by the largest anticipated vehicles?
		Is the project regulated by USACE EM 385-1-1?
		If so, do haul ways meet the requirements of EM 385-1-1, Section 8.D?
		Have reinforced dump beds been specified for semi-type dump truck beds?
		Is dumping curtailed in high wind conditions?
		Has the use of board roads been considered?
		Are speed limits posted on site roads?
		Are the limits enforced?
		Is driving across slope or turning on grade minimized?
		Is use of seat belts and wearing of hard hats by operators of on-site haul vehicles strictly enforced?

**APPENDIX C Good Practice Based EM 385-1-1 SECTION 8.D**  
**(For Projects subject to EM 385-1-1 see the specific regulation wording.)**

## **HAUL ROADS**

Access/haul roads will be designed in accordance with current engineering criteria. Prior to construction, the Contractor will provide the client representative with a copy of the plan for review and if required by contract acceptance. If required by contract, work on the haul road will not commence until the client representative has accepted the plan.

The plan will address the following items:

- Equipment usage, traffic density, and hours of operation.
- Road layout and widths, horizontal and vertical curve data, and sight distances.
- Sign and signalperson requirements, road markings, and traffic control devices.
- Drainage controls.
- Points of contact between vehicles and the public, and safety controls at these points of contact.
- Maintenance requirements, including roadway hardness and smoothness and dust control.
- Hazards adjacent to the road such as bodies of water, steep embankments, etc.

No employer will move, or cause to be moved, any equipment or vehicle on an access or haul road unless the roadway is constructed and maintained to safely accommodate the movement of the equipment or vehicle involved.

When road levels are above working levels, berms, barricades, or curbs will be constructed to prevent vehicles overrunning the edge or end of embankment. Berms/curbs will be constructed to one-half the diameter of the tires of the largest piece of equipment using the roadway.

Roadways will have a crown and ditches for drainage. Water will be intercepted before reaching a switch back or large fill and be led off.

Haul roads will be constructed to widths suitable for safe operation of the equipment at the travel speeds proposed by the Contractor and accepted by the Government Designated Authority (GDA).

All roads, including haul roads, will be posted with maximum speed limits.

An adequate number of turn-outs will be provided on single lane roads haul roads with two-way traffic. When turn-outs are not practical, the Contractor will provide a traffic control system to prevent accidents.

Whenever possible, use a right-hand traffic pattern on two-way haul roads.

### Curves

- All curves will have open sight line and as great a radius as practical.
- Vehicle speed will be limited on curves so that vehicles can be stopped within one-half the visible distance of the roadway.
- The design of horizontal curves will consider vehicle speed, roadway width and surfacing, and super elevation.

## Grades

- When necessary, based on grade and machine and load weight, machines will be equipped with retarders to assist in controlling downgrade descent.
- Truck haul roads should be kept to less than a 10% grade.
- There should be no more than 400 ft (121.9 m) of grade exceeding 10%.
- The maximum allowable grade will not exceed 12%.


Lighting will be provided as necessary.

Traffic control lights, barricades, road markings, signs, and signal persons for the safe movement of traffic will be provided in accordance with the DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices" and this Section.

Roadway hardness, smoothness, and dust control will be used to maintain the safety of the roadway.

All roads will be maintained in a safe condition and eliminate or control dust, ice, and similar hazards.

The deposition of mud and or other debris on public roads will be minimized to the extent possible and in accordance with local requirements.

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## Purpose

The purpose of this Field Operation Procedure (FLD) is to provide Best Practices and requirements for identification, location, and avoidance of underground utilities, appurtenances, and structures during intrusive activities. These requirements are applicable to all Weston Solutions, Inc. (WESTON) operations. This FLD also addresses actions to be taken in response to encountering or contacting underground utilities.

## Scope


This FLD covers all employees involved in sub-surface intrusive activity projects performed by Weston Solutions.

## Key Responsibilities

### Competent Person

The Competent Person shall be responsible for:

- Obtaining a copy of, and understanding the applicable regulations for the state of jurisdiction where the excavation activities are to be performed.
- Contacting the appropriate One-Call Agency or private locating service, as applicable.
- Recording One-Call locate numbers.
- If necessary, renewing One-Call locate numbers before expiration.
- Ensuring that white-lining of the area to be excavated is performed; if another equal or better protective measure is necessary because of the nature of the work, state/local regulation, or client requirements, the HASP should be amended to reflect the change.
- Ensuring that a “positive response” has been received from every utility owner/operator identified by the One-Call Agency (and any non-member utility as necessary) and that they have located their underground utilities and have appropriately marked any potential conflicts with the areas of planned intrusive activities prior to the start of intrusive work.
- Ensuring that appropriate means for supporting and protecting any exposed utility have been discussed with the utility owner and such means are available on-site.
- Ensuring that above-ground utilities and other appurtenances will not create a problem, or be impacted by WESTON activities. In all cases provisions for protection of any utility, structure, or appurtenance must be made.

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- Ensuring that provisions for emergency actions and emergency shut-off/mitigation of utilities have been discussed with utility owners and field personnel.
- Ensuring that pictures are taken before, during, and after intrusive activities and placing such pictures in the project file. Pictures should provide visual documentation of actual site conditions, including but not limited to exposed utilities, methods used for bracing utilities and markings placed on the surface by utility locating services. Consideration should also include placing of a known object in the picture field to provide a “scale” for size/distance comparison.
- Completion and maintenance of the Underground Utilities Locating and Marking Checklist (Attachment A) and the Underground Utilities Management Checklist (Attachment B).
- Reviewing applicable Activity Hazard Analyses (AHAs) with all project members before work begins.
- Conducting training on communication protocols to be used by the excavation observer and equipment operator.
- Ensuring implementation of appropriate work practices during intrusive activities (including maintaining the prescribed buffer zone for use of aggressive methods).
- Conducting daily or more frequent (due to changes in conditions) inspections of the excavation area to make sure that all markings are intact.
- Providing the Field Safety Officer (FSO) with all required documentation on a daily basis.

## Observer

Whenever intrusive operations with mechanized equipment are being conducted within three feet of the outside edge of the buffer zone, horizontally and vertically, an observer must be assigned to monitor the activities. The observer is responsible for:

- Maintaining a safe vantage point relative to digging machinery, excavation edge, and proximity to the hazard posed by the utility.
- Observing the operation to ensure that the operator stops operations if utilities are observed.
- Reviewing hand signals and other forms of communication with the operator. Note: hand signals should be as those identified under ANSI, OSHA, or the Corps of Engineers for Crane Hand Signals, or another, equally effective and understood system.
- Properly signaling the operator.
- Stopping the operation immediately if the observer’s attention must be diverted even momentarily.

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- Stopping the operation immediately if a hand signal or other directive is not followed. Operations will not resume until the observer and operator mutually agree that the reason(s) for not complying with the directive(s) are/is identified and fully corrected.
- Maintaining required records, such as logbook entries, or other, as requested by line management.


### Operations/Line Management

The Project Manager (PM) or Site Manager (SM) shall be responsible for:

- Establishing the site culture with the assistance of the FSO that ensures compliance with this FLD, as well as providing the leadership to “do the right thing” whenever unanticipated circumstances arise.
- Providing the necessary resources, including sufficient schedule for compliance with this FLD.
- Designating a Competent Person or ensuring that a subcontractor Competent Person is designated, prior to the start of work – who possesses the qualifications and requisite experience to act in such capacity.
- Discussing intrusive activity liability with the Client prior to the start of work. Best practices for identification of underground utilities must be included with the proposal and/or HASP, as well as WESTON’s requirement for Client sign-off (if the Client is the property owner or if the Client selects the drilling/intrusive action location) when identifying specific work locations for intrusive activities. In cases where the client, such as EPA, will or cannot sign off on liability or provide indemnification, discussions with the appropriate client representatives on intrusive activities will be documented in the project file.

**Note: In any ‘target-rich’ work environment, best practices must include the requirement for potholing/daylighting or careful hand-digging – whenever possible (at least 5 feet below grade) – since these are recognized processes for visually verifying the exact location of underground utilities while minimizing the potential for utility damage.**

- **For excavations using aggressive methods in target-rich environments**, consideration should be given for establishing an agreement with an Emergency Response Contractor and/or the specific utility owner prior to the start of intrusive activities. This agreement should include specific emergency notification procedures for each utility identified to ensure that timely response can be accomplished in the event of a utility strike.
- Determining/verifying ownership of the property where the intrusive activity will occur, including any easements.

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- Contacting all utilities not notified directly by the utility notification center, including those known to local personnel and the property owner.
- Obtaining Profit Center Manager approval for any deviations from this FLD, including best practices, or for addressing any set of circumstances not specifically addressed in this FLD that may place WESTON or its employees at risk.

### Environmental, Health, and Safety Personnel

The Field Safety Officer (FSO) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this FLD.
- Consulting with the PM, SM, Competent Person, and the appropriate Division Environmental, Health, and Safety Manager (DEHSM) (or Corporate EHS) on underground utility issues.
- Acting as the Competent Person or Observer as necessary and qualified.

### Project-Employees

- Be familiar with the Best Practices and requirement contained in this FLD.
- Comply with all company Environmental health, Safety and Security policies.
- Have knowledge of the hazards associated with sub-surface intrusive activities.

## Definitions

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### Aggressive Methods


The use of mechanized equipment such as (but not limited to) excavators, backhoes, drill rigs, directional drilling, Geoprobe operations (including all direct push techniques), or road saws.

### Buffer Zone

As defined in this procedure, the area around a utility where only non-aggressive excavation methods may be utilized, unless specific conditions are met.

The definition cited above, and the excavation requirements and restrictions associated with it, will vary depending on the particular state regulations. WESTON requires the imposition of a **three-foot** Buffer Zone on all sides of the utility as measured from the outside edges of the utility, both horizontally and vertically. State and/or local buffer zone requirements must be verified by consulting the applicable state regulations in the event buffer zones greater than three feet are required.

The term "Buffer Zone" may be referred to as the "Tolerance Zone", "Safety Zone", or "Approximate Location of Underground Utilities" in some jurisdictions.

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## **Competent Person**

A Competent Person has the ability to recognize hazards associated with underground utilities and the authority to stop or direct operations to ensure the safety of personnel and conformance with this procedure. The Competent Person has an understanding of this procedure, and the “One-Call” system requirements for the jurisdiction where excavation is occurring. The Competent Person must be capable of notifying One-Call agencies and maintaining and tracking One-Call Locate Numbers. Additionally, they must have knowledge of methods and work practices for excavation work and the identification, avoidance, and protection of underground utilities.

The designation of a Competent Person will be made by the Site Manager (SM) or Project Manager (PM) and documented in the site-specific Health and Safety Plan (HASP) or attachment to the HASP. Each WESTON Competent Person is required to successfully complete WESTON’s internal training program on the use and application of this FLD and possess appropriate and relevant field experience.

The names of Subcontractor Competent Persons will be documented in the Site-Specific *Subcontractor Acknowledgment: Supervisor Personnel, Competence of Personnel, and Task Understanding* form. Subcontractor Competent Persons will be expected to follow this FLD or their company’s procedures, whichever is more restrictive.

## **Damage**


Damage may be considered as any undesired impact or unanticipated removal of support from an underground utility as a result of excavation or demolition. Damage may be as simple as minor contact (by any means) resulting in displacement of protective coating. The utility owner must be contacted regarding any damage or question of damage.

## **De-Energize**

As applicable to a utility, to physically eliminate and/or prevent the presence, transmission, flow, or release of energy or materials which may cause harm to personnel or property.

## **Excavation (Intrusive Activity)**

An operation using mechanized equipment for the purpose of movement or removal of earth, rock, or the materials in the ground, including but not limited to: digging, blasting, augering, test boring, drilling, pile driving, directional drilling, grading, plowing-in, hammering (including hammer-drill soil gas sampling tube installation), pulling-in, jacking-in, trenching, tunneling, structural demolition, milling, scraping, tree and root removal (grubbing), and fence or sign post installation. Note that in some States or jurisdictions, excavation may include hand augering or use of other hand tools.

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## **Jurisdiction**

The Authority having legal jurisdiction for establishing and/or enforcing regulations and requirements for notification of excavation activities and associated identification and marking of underground utilities. In the United States, the States have jurisdiction, and most consider the regulations applicable when excavation is to be performed in any location, including any public or private way, any company right-of-way or easement, or any public or privately owned land or way. Note: One caveat to remember – Jurisdiction may flow to the “owner” on private or government-owned property because the State One-Call Agencies may not clear utilities on such facilities.

Note that easement boundaries may require differing methods for compliance assurance. Railroads and certain above ground utilities have easements that require specific procedures for excavation (including shoring and shielding of both the utility as well as for the track and/or poles). In these cases it may be required that an inspector or representative of the railroad or utility is present at all phases of the activity.

## **Locate**

To indicate the existence of a utility by establishing a mark through the use of flags, pins, stakes, paint, or some other customary manner, that *approximately* determines the location of a line or facility.

## **Locate Request**


Formal/Active communication between an entity performing intrusive activities and a utility marking agency (One-Call, etc).

## **Non-Aggressive Methods**

Non-Aggressive methods involve the use of manual methods such as hand digging with shovels or by potholing or daylighting methods.

## **Observer**

The person assigned to visually monitor and, as needed, signal the operator during mechanized intrusive activity when the activity is occurring within three feet of the outside edge of the buffer zone. The observer remains in close communication with the equipment operator(s) and will stop the activity if needed.

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### **One-Call Agency**

An entity that administers a system through which a person can notify owners/operators of underground lines or utilities of the intent to perform intrusive activities in proposed public access areas. **It is important to note that not all underground utility owners may be required to join the One-Call system. Additionally, some underground utility owners may not comply with State registration requirements.**

The SM or Competent Person is responsible to determine additional utilities that may need to be contacted individually.

### **Positive Response**

Verification prior to the intrusive activity, to ensure that all contacted (typically via the One-Call Agency) owner/operators have located and marked the underground utilities. The SM or Competent Person is responsible to determine/verify ownership of the property where the intrusive activity will occur, including any easements.


### **Potholing or Daylighting**

The practice of exposing an underground facility by safe, *non-aggressive* excavation methods in order to determine the precise horizontal and vertical position and orientation of underground lines or utilities. potholing or daylighting are terms used to describe the excavating of buried facilities using an air or water “knife” coupled with vacuum excavation that exposes underground utilizes to the “daylight” – a positive and safe means of identification and confirmation of exact **UTILITY LOCATION**.

### **Target Rich Environment**

Areas where multiple utilities are known or suspected of being located, areas where utility locations are in question and/or difficult to obtain information on, or areas with known or suspect high-risk utilities are known as target-rich environments.

**Note: Military Bases (active or inactive) are to be considered “Target Rich Environments”.**

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## **Underground Utility**

An underground or submerged conductor, pipe, or structure used in transporting or providing electric, communications service, gas, oil or oil product, sewage, storm drainage, water, or other service and appurtenances thereto. As used in this procedure, utility includes all underground appurtenances and structures.

The following are examples of the types of underground utilities that may be present in a given location:


- Natural gas pipelines
- Electric cables
- Water pipelines
- Fiber optic telecommunications lines
- Telephone cable lines
- Steam pipelines
- Gasoline, oil, or other fuels
- Sewer pipelines
- Vents for sewer and gasoline/diesel fueling systems
- Underground Storage Tanks (USTs)
- Abandoned underground structures containing hazardous materials, hazardous wastes, and radioactive materials

## **Underground Utility Owner**

Any person, utility, municipality, authority, political subdivision or other person or entity who owns, operates, or controls the operation of an underground line/facility.

## **White Lining**

The practice whereby the person (in this case WESTON or a Subcontractor) who intends to perform intrusive activities, pre-marks the site with an outline of the area where intrusive activities will occur. This involves the use of white paint, flags, stakes, or a combination thereof to mark the extent of where work is to be performed. The marking may vary depending on what intrusive activities are to be conducted. For example, for general excavation, an areal outline of the excavation shall be marked, while for drilling, the individual boreholes shall be marked. Studies have shown that pre-marking is a

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practice that does prevent utility contact incidents. Check State or local regulatory requirements to ensure compliance.

## Procedure/Best Practices/Requirements

The following sections provide the requirements and recommendations, which are intended to prevent injury to personnel, damage to infrastructure, and associated indirect effects associated with encountering or contacting underground utilities during intrusive work. Underground utilities present multiple potential hazards that must be recognized before and during work which occurs near them, therefore, this procedure is divided into sections addressing underground utility identification and location, working around or near underground utilities, and actions to be taken in the event that underground utilities are encountered or contacted. Hazards that may be presented by underground utilities include explosion and fire, electrocution, toxic exposures, pathogens, and drowning.


### Identifying and Locating Underground Utilities

The potential for underground utilities or other subsurface feature (e.g., subsurface mines) must be evaluated as early as possible in the planning phase for any project which involves intrusive activities. The following sections describe various methods for identifying and locating utilities on a site. The *Underground Utilities Locating and Marking Checklist* (Attachment A) and the *Underground Utilities Management Checklist* (Attachment B) must be completed before any activities meeting the definition of excavation are conducted. Attachment A is intended to be used as a guide during the process of locating and marking utilities in the area to be excavated. Attachment B is intended to be used as a guide in the overall process of underground utilities management during the course of the project.

**Note:** Attachments A and B or their equivalents must be used to document compliance with this FLD and will be subject to audit.

Prior to excavation all underground utilities must be located and identified by at least two of the following:

- The Utility Owner
- The Property Owner
- A Private or Public Utility Locating Service
- Review of the most current utility drawing, maps or other available records by an approved WESTON Competent Person

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- Use of utility locating technology by a WESTON Competent Person or subcontractor – this includes the use of potholing or daylighting in a “target-rich” work environment or whenever a full clearance (without restrictions) cannot be obtained from a utility locating service.

As an aid in determining the potential for or existence of utilities follow the criteria outlined in Attachment C (Utilities Research Options).

### ***Pre-Planning and the Site HASP***


The site-specific HASP developed for the project must:

- Identify the location and types of underground utilities that are believed to be present on the site.
- Reference this procedure (FLD 34), and describe how it will be implemented on the project.
- Contain an AHA in which the hazards associated with underground utilities are identified, as well as the measures used to control them.
- Contain any site or contract-specific requirements (e.g., Corps of Engineers, EM 385-1-1, Section 25) that may be applicable.
- Contain clear and concise procedures to be followed in the event that contact with underground utilities occurs.
- Address underground utilities and potential associated scenarios in the emergency response section of the HASP.

### ***“One-Call” Locating and Marking Services***

Every state has utility marking service programs that have various names such as “One-Call”, “Dig-Safe”, “Call-Before-You-Dig”, “Dig-Safely”, and many others. These services will identify the types and locations of any utility that may exist in an area to be excavated, as long as the property is in the public domain.

- The appropriate One-Call service for the jurisdiction where the project is located must be contacted prior to beginning excavation work. The One-Call Agency should be given as detailed a description of the property as possible; address, cross street, utility pole numbers, physical description, etc.
- Notification to the One-Call service shall allow sufficient lead-time for the Agency to mark the utilities before excavation begins. The lead times vary, but range from two to ten days, depending on the state of jurisdiction.








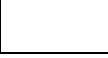
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- In the event the State or Local One-Call service number is in question call "811" (the Federal Call before You Dig Number) for access to the appropriate locator service.
- A complete listing of One-Call agencies and telephone numbers for all states is available in the "One- Call and State Law Directory", which can be accessed on the Internet at:  
[www.excavationsafetyonline.com/esg/guidePDFs/2012\\_2012\\_ESG\\_BS\\_45:51.pdf](http://www.excavationsafetyonline.com/esg/guidePDFs/2012_2012_ESG_BS_45:51.pdf)
- Once notified, the One-Call Agency will provide the contractor with a unique "locate number" or "reference number". This reference number must be kept in the project files by the Competent Person or designee. Additionally, the reference numbers have expiration dates, which may vary depending on the particular One-Call Agency. The valid period of the locate number and required renew notification date shall be requested from the One-Call Agency.
- On a project with multiple contractors, each contractor must request a separate locate number. Under no circumstances will any other contractor or entity be allowed to "work under our locate number". Subcontractors to WESTON may excavate under the locate number secured by WESTON, provided that they are excavating within the area which was previously white-lined by WESTON and subsequently marked. **However, the One-Call Agency must be contacted and notified of this arrangement so that the subcontractor can be recorded as working under the existing locate number.** If a WESTON subcontractor will be excavating in an area not white-lined by WESTON, then the WESTON subcontractor must request a new locate. **Note: State and local requirements must be checked for local application of this procedure.**
- The area where work is to be performed shall be white-lined before the locating service goes to the site.
- It is good practice to arrange a pre-excavation meeting at the project site with the personnel performing the utility location and marking. This meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high-priority utilities.
- The One-Call Agency should provide the identities of the utility owners that will be notified of the locate request. This information shall be recorded on the Underground Utilities Locating and Marking Checklist (Appendix A) and maintained in the project files. The contact person and phone number for each utility owner shall also be recorded. **Note that all utility owners are not members of the One-Call system.** This does not eliminate the need to contact a non-member owner if you have knowledge or suspect that excavation will impact their utility.
- The utility owners should provide a "positive response" relative to the locate request, which can consist of two types of action by the utility owner. The facility owner or operator is required to 1) mark its underground utilities with stakes, paint, or flags, or 2) notify the excavator that the utility owner/operator has no underground utilities in the area of the excavation.


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- The positive responses shall be recorded on the Underground Utilities Locating and Marking Checklist (Attachment A) and crosschecked with the list of utility owners that the One-Call Agency stated they would notify. If it is discovered that a utility owner has not provided a positive response, then the One-Call Agency must be notified.
- Excavation shall not be conducted until positive responses have been received from all utility owners identified by the One-Call Agency as having underground utilities on the property.
- Before beginning excavation, the excavator must verify that the location marked was correct, and the distinct, color-coded markings of all utility owners are present.
- Examine the site to check for any visible signs of underground utilities that have not been located and marked such as pedestals, risers, meters, warning signs, manholes, pull boxes, valve boxes, patched asphalt or concrete pavement, areas of subsidence, fresh sod or grass, lack of grass or vegetation, and new trench lines.
- The markings placed by the utility owners should be documented by WESTON using a still, digital, or video camera, whenever practical and reasonable. The photo-documentation shall be maintained with the project files.
- The markings placed by the utility owners or marking services typically follow the American Public Works Association Uniform Color Code as described in ANSI Standard Z 535.1. This code follows:

#### American Public Works Association Uniform Color Code

Red		Electric Power Lines, Cables, Conduit
Orange		Communications, Telephone, Cable TV
Yellow		Gas, Oil, Steam, Petroleum or Gaseous Materials
Green		Sewers and Drains
Blue		Potable Water Systems
Purple		Reclaimed Water, Irrigation, Slurry Lines
Pink		Temporary Survey Markings
White		Proposed Excavation

**Note:** Unless otherwise specified in the utility clearance, such clearance will not be considered valid after 30 days from the date it was issued.

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### *Private Utility Locating and Marking Services*

- **One-Call agencies arrange for the identification and marking of underground utilities only on public property, up to the point of contact with private property.** In the event that activities are to be conducted on non-public properties, the presence, location, depth, and orientation of all underground utilities shall be ascertained through records review, including any site plot plans, utility layout plans, and as-built drawings available from the property owner, as well as through interviews with knowledgeable personnel associated with the property (See Attachment C). Additionally, for excavations using aggressive methods in target-rich environments or other situations where utility locations are in question, the information gathered from these sources shall be verified by physical detection methods (non-aggressive), performance of a geophysical survey, or by procuring the services of a private utility locating and marking service. If any detection methods are to be self-performed, the requirements within this FLD must be followed.

### *Self-Performance of Utility Locating and Marking*

The techniques and instruments used to locate and characterize underground utilities can be extremely complicated and difficult to use effectively. Additionally, interpretation of the data generated by this instrumentation can be difficult. The utility marking services, as previously described are staffed by well-trained, experienced professionals who perform locating activities on a regular basis. For these reasons, it is most desirable that these professional services are used for utility location and marking on projects.

- In some instances on private property or in other areas not served by One-Call agencies (e.g., long-term projects where excavation is a primary task, and the presence of underground utilities is extensive) it may be prudent to self-perform locating and marking activities.
- If locating and marking is to be self-performed, all personnel using instrumentation will be trained on the use of the equipment that will be used, and the interpretation of the data.
- There are a variety of locating methods which may be utilized for self-performance of utility locating as categorized below:
  - Magnetic field-based locators or path tracers
  - Buried electronic marker systems (EMS)
  - Ground penetration radar-based buried –structure detectors
  - Acoustics-based plastic pipe locators
  - Active probes, beacons, or sondes for non-metallic pipes
  - Magnetic polyethylene pipe
- Before self-performing any underground utility locating on a project, approval must be obtained from the appropriate WESTON DEHSM or the Corporate EHS Director.

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## **Working Near or Around Underground Utilities**

After the site has been properly evaluated for the presence of aboveground utilities, underground utilities, and other appurtenances, intrusive activities may begin. Because there is no perfect way of eliminating the hazards presented by underground utilities, an effort must be made to perform the tasks following the direction and guidance as described by the following best practices that should be implemented during the execution of the project.

### ***Work Site Review***

Before beginning intrusive activities, a meeting shall be held between all members of the project team. This shall consist of a review of the marked utility locations with the equipment operators, observers, laborers, etc.

### ***Preservation of Marks***


During excavation, efforts must be made to preserve the markings placed by the utility owners until they are no longer required. If any markings are obliterated, the One-Call Agency must be contacted for re-marking. No intrusive activities are to take place if markings are not visible.

### ***Excavation Observer***

Whenever intrusive operations are being conducted within three feet of the edge of the buffer zone, an observer must be assigned to monitor the activities. The observer will be designated each day, and a review of hand signals and other forms of communication between the observer and operator will be conducted. The directives of the observer will be followed precisely and immediately by those operating equipment.

### ***Excavation within the Buffer Zone***

Mechanical means of excavation may not be used within 36 inches (see Buffer Zone) of any marked or suspect utility until the utility has been exposed. Mechanical methods may be used, as necessary, for initial penetration and removal of pavement, rock or other materials requiring use of mechanical means of excavation provided a spotter is used. Once the underground utility has been exposed, further excavation must be performed, employing reasonable precautions to avoid damage to the utility, including but not limited to any substantial weakening of structural or lateral support, or penetration or destruction of the utility or its protective coatings. For purposes of this section, “mechanical means of excavation” means excavation using any device or tool powered by an engine except air vacuum or like methods of excavation.

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A request to utilize aggressive excavation methods in the buffer zone may be made if:


- There is no other appropriate and reasonable alternative to using aggressive methods in the buffer zone; and
- The utility has been de-energized (and purged if necessary), verified as de-energized, and locked-out; or
- The depth and orientation of the utility has been adequately and visually determined through the use of non-aggressive methods such as air/hydro/vacuum excavation, potholing, probing, hand-digging, or a combination thereof; and
- For utilities containing electrical energy, the depth of the existing water table is below the location of the utility; and
- Request for the exemption has been submitted to the appropriate DEHSM and Profit Center Manager for approval.

The following conditions will apply to this request:

- Aggressive methods may be used in the buffer zone only to the extent allowed by the applicable state or other jurisdictional regulations.
- Appropriate physical protection measures for exposed utilities shall be implemented to eliminate the potential for equipment contact with utilities.
- The extent of the project excavation area to be covered by the exemption request must be specified in the request for exemption.
- When evaluating the use of aggressive excavation methods in the buffer zone, the DEHSM will consider the type of utility involved and the associated risk potential. Based on this evaluation, the Profit Center Manager and/or DEHSM may impose further conditions and requirements. Even if the above exemption conditions are met, the DEHSM has authority to deny the request.

Unless exempted according to the above provisions of this procedure, only non-aggressive methods may be used within the buffer zone. These methods are used in order to prevent mechanical contact with underground utilities, which could result in damage to the utility and create the potential for personal injury and property damage. Following are examples of non-aggressive excavation methods:

- Hand-digging
  - Non-conductive hand tools must be used when digging within the buffer zone surrounding underground electrical utilities.


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- If conductive hand tools must be used near electrical lines, then the FSO and/or DEHSM shall be consulted to determine additional requirements relative to safe electrical practices, procedures, and equipment.
- Hydro-excavation (water pressure).
- Air excavation (air pressure).
- Vacuum extraction (soil excavation/removal).
- Air excavation/vacuum extraction combination.
- Aggressive methods may be used for the removal of pavement over a utility, if allowed by the state regulations.

### ***Protection of Underground Utilities***

It is very important that consideration be given to the protection of underground utilities when performing adjacent intrusive activities. This is necessary not only to prevent physical damage and associated indirect effects, but also to prevent the potential for injury to employees and the public.

- When using aggressive excavation methods within the buffer zone around exposed underground utilities, physical protection must be used as required by OSHA in 29 CFR 1926.651. Basically, this involves creation of a physical barrier between the mechanized operation and the utility. The following are some possible types of physical protective measures:
  - Heavy timbers, similar to swamp or crane mats.
  - Sheets of plywood.
  - Blasting mats.
- Once exposed, underground utilities no longer have the support provided by surrounding soil and may need to be physically supported to prevent shifting, bending, separation, or collapse, which could result in damage to the utility, and possibly personnel. Following are suggested support methods:
  - Timber shoring underneath the utility.
  - Timbers or girders over the top of the excavation fitted with hangers that support the utility.
  - Design by a Professional Engineer for complicated or large applications.
- Utilities must also be protected from objects that may fall into the excavation such as rocks and equipment. This can be accomplished by following these guidelines:
  - Cast spoils as far away from the excavation as possible. Excavated and loose materials shall be kept a minimum of two feet from the edge of excavations.
  - Relocate large rocks, cobbles, and boulders away from the excavation and sloped spoils piles.


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- When vehicles and machinery are operating adjacent to excavations, warning systems such as soil berms, stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling into the excavation.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

### **De-Energizing Utilities**

Utilities can carry many types of potential energy, including electricity, flowing liquids, liquids under pressure, or gasses under pressure. A release may happen if a utility conveyance is compromised and could result in personal injury, property damage, and other indirect effects. If the white lines of the proposed excavation area overlaps or extends into the buffer zone of a known underground utility, then if at all possible, that utility should be de-energized to physically prevent the transmission, flow, or release of energy. Conversely, if the buffer zone of the known utility lies outside of the white-lined, proposed excavation area, then de-energizing is not required.

- The owner of the utility shall be contacted to determine the feasibility and methodology of de-energizing the utility. Plenty of lead-time should be provided for this since it may take utility companies weeks to de-energize some utilities.
- Depending on the utility and the material being conveyed, isolation points which may be suitable for de-energizing include but are not limited to the following:
  - Electrical circuit breakers
  - Slide gate
  - Disconnect switches
  - Piping flanges
  - Other similar devices
- When utilities are de-energized, it must be verified by demonstration. This can be accomplished by methods such as, testing equipment, switching on a machine or lighting, or opening a valve. For any current-carrying electrical equipment, such as cables or electrical panels, successful de-energizing must be certified through the use of appropriate electrical testing equipment and qualified personnel.
- Whenever a utility is de-energized, a means of ensuring that the energy isolation device and equipment cannot be operated until the device is removed must be provided.
- When de-energizing and locking out of utilities is practiced, the provisions of FLD 42 Lockout/Tagout shall be followed, as applicable.

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### ***Damage Discovery***


During excavation, utility damage may be discovered which is pre-existing or otherwise not related to a known contact. Disclosure to the utility owner is very important because the possibility of utility failure or endangerment of the surrounding population increases when damage has occurred. The utility may not immediately fail as a result of damage, but the utility owner or operator must be afforded the opportunity to inspect the utility and make a damage assessment and effect repairs if necessary. The following guidance applies:

- Observe and photograph the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, or other damages to utility lines, conduits, coatings, or cathodic protection systems.
- The owner of the affected utility must be contacted immediately.
- The One-Call Agency or private location service must be contacted immediately.
- A Notification of Incident (NOI) Report will be used to document such a discovery.

### ***Encountering Unexpected Underground Utilities***

It is possible that underground utilities will be encountered in locations that have previously been “cleared” of having underground utilities by the locating service, or are found outside of the area, which has been marked as having underground utilities. In either case, if this occurs, the following applies:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped.
- The owner of the affected utility must be immediately contacted.
- The One-Call Agency or private location service must be contacted immediately.
- The PM, SM, and FSO must be notified.
- No further intrusive activities may be conducted until:
  - The One-Call Agency/private location service and/or the subject utility owner visit the site;
  - Identification of the utility owner and the type of material/energy being conveyed by the utility has been made; and
  - The orientation and depth of the subject utility has been determined and suitably marked.
- A NOI Report must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.

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### Contacting Underground Utilities

If excavation or other equipment being used for intrusive activities makes contact with an underground utility, the following guidelines apply:

- Site personnel must be warned and moved to a safe location; equipment engines and ignition sources should be turned off, if possible, as the operator is exiting his/her equipment.
- Intrusive activities must be stopped immediately.
- Observe the utility from a safe distance and determine if there is damage. Damage would be all breaks, leaks, nicks, dents, gouges, grooves, scratched coatings, cathodic protection compromise, material leakage, obvious electrical energy.
- Move all personnel to the evacuation meeting point as described in the HASP.

**EXCEPTION:** *If an electrical line has been contacted and it is your belief that equipment (such as an excavator) is electrically energized, do not approach the equipment. Order the operator to remain in the equipment until emergency personnel can de-energize the source (unless the equipment is on fire, at which time the operator should jump off of the vehicle and shuffle along the ground to a safe area). Shuffling is required because current flows outward through the soil in a ripple pattern called a power gradient, creating a pattern of high and low potential, Shuffling decreases the chance that these gradients could be bridged, causing current to flow through the body, resulting in electrocution.*

- Secure the area to prevent the public from entering.
- Contact emergency responders as specified in the HASP.
- Immediately contact the One-Call Agency or if known, the utility owner.
- Notify the PM, SM, FSO and DEHSM.
- No further intrusive activities may be conducted until:
  - The utility owner inspects the scene and after repairs, verifies that all danger has passed.
  - The orientation and depth of the subject utility has been determined and suitably marked.
  - Permission from the emergency responders to resume work has been given.
- A WESTON NOI Report must be completed. The report should be accompanied by photographs clearly showing the marking(s), and the actual location, with a distance gauge to document how far off the mark the utility was encountered.
- State and Local regulations must be reviewed to determine if reporting to any additional agencies is required.

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## Training

Training shall occur prior to exposure of underground utility-related hazards or operation of subsurface intrusive equipment and shall include co-workers working in the immediate vicinity of the equipment/intrusive activity that have the same exposure.

All training shall be documented.


## ATTACHMENTS

Attachment A – Underground Utilities Locating and Marking Checklist

Attachment B – Underground Utilities Management Checklist

Attachment C – Utilities Research Options


Informational Addendum - Overview of Underground Utility Detection Methods

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**ATTACHMENT A**  
**UNDERGROUND UTILITIES LOCATING AND MARKING CHECKLIST**  
 To be Completed by PM and/or "Competent Person"  
 Complete Form as Location/Marking Progresses and Maintain in Site Files

<b>PROJECT INFORMATION:</b>	<b>Location:</b>
<b>Project Name:</b>	Task/Activity:
WESTON Competent Person:	Start Date of Work:
WESTON Subcontractor: <input type="checkbox"/> No <input type="checkbox"/> Yes:	Private Locating Service Required: <input type="checkbox"/> Yes <input type="checkbox"/> No
Subcontractor Competent Person:	If Not, Explain:
Property Owner:	
<b>NOTIFICATION:</b>	
<b>Locating Service Name:</b>	Locating Service Tel. Number:
Date Locating Service Notified:	Locate Ticket Number:
Address of Property to be Marked:	Locate Ticket Expiration Date:
Nearest Intersecting Street:	
Are There Any Utilities on the Properties That the Locating Service Will Not Contact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Specify:	

*Enter Utility Information in Table 1 Below. In Addition to Utility Locating Services, Consult Client, Utility Owners, Drawings, Facility Personnel, Maintenance Personnel, Municipalities (See Appendix C).*

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**Table 1. On-Site Utility Information**

Name of Utility Company	Type of Utility	Color Code	Utility Present On-Site?	Emergency Phone Number	Date Marks Completed
	Electric	RED			
	Communications, Phone, CATV	ORANGE			
	Gas, Oil, Steam, Petroleum	YELLOW			
	Sewers, Drains	GREEN			
	Potable Water	BLUE			
	Reclaimed Water, Irrigation	PURPLE			
	Temporary Survey Markings	PINK			
To be performed by excavator prior to utility mark-out.	Proposed Excavation	WHITE			

White-Lining Completed?

☐ No Explain: \_\_\_\_\_  
Whom? \_\_\_\_\_

☐ Yes: Date: \_\_\_\_\_ By \_\_\_\_\_

**LOCATING AND MARKING:**

Have All Utilities Identified in Table 1 Been Marked?

☐ Yes ☐ No (If No, Contact Locating Service for Resolution)

Problem(s) With Markings?

☐ Yes ☐ No ☐ No Marks ☐ Incorrect Location ☐ Too Wide


☐ Other: \_\_\_\_\_ ☐ Not All Utilities Marked Per Table 1 (notify marking service)

Measurements Taken: ☐ Yes ☐ No

Documentation of Marks: ☐ Photos ☐ Video ☐ Other: \_\_\_\_\_

**EXCAVATION:**

Utilities Accurately Marked? ☐ Yes ☐ No

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If no, describe: \_\_\_\_\_

Were Unmarked or Miss-Marked Utilities Encountered? ☐ Yes ☐ No

If Yes, Specify: \_\_\_\_\_


Locating Service Notified? ☐ Yes ☐ No

Will Excavation Continue Past Locate Number Expiration? ☐ Yes ☐ No

If Yes, Locate Number Renewed? ☐ Yes ☐ No New Expiration Date: \_\_\_\_

Additional Problems or Concerns - Specify: \_\_\_\_\_

Form Completed By:	Signature:	Date:
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**ATTACHMENT B**  
**UNDERGROUND UTILITIES MANAGEMENT CHECKLIST**  
*Weston Solutions, Inc.*


To be Completed by PM and/or “Competent Person”

Complete Form as Project Progresses and Maintain in Site Files.


PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
<b>Pre-Planning</b>	1	Excavation/Best Practices in Work Scope?				
	2	Underground Utilities Identified?				
	3	Competent Person Assigned?				
	4	Has a Copy of the Applicable State Regulations Been Obtained, Read, Understood?				
	5	EHS Plan Addresses Underground Utilities? (AHAs, Contingency Plan, State Regulations Appendix)				
<b>Identifying, Locating and Marking</b>	6	Locating and Marking Checklist Initiated? (Attachment A)				
	7	Identification and Address of Property Determined, Including Nearest Intersection?				
	8	One-Call Agency Contacted?				
	9	Additional Locating and Marking Required on Property? (One-Call agency marks to public property line only)				
	10	Additional Marker/Locator Identified?				
	11	Additional Marker/Locator Qualified?				
	12	Weston Self-Performing Location and Marking?				
	13	If Yes to 12 Above, Approval From Division EHS Manager?				

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PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
<b>Identifying, Locating and Marking</b>	14	Area of Excavation “White-Lined” by WESTON?				
	15	WESTON Present When Markings Completed?				
	16	All Utilities Marked? (Refer to Attachment A, Table 1)				
	17	All Markings Photo/Video Documented?				
<b>Identifying, Locating and Marking – Continued</b>	18	Area Checked for Signs of Previous Excavation? (Subsidence, new grass, patching, etc)				
	19	All Applicable Information Recorded on Attachment A?				
	20	Multiple Contractors Excavating On-Site?				
	21	Separate Locate Requests for All Contractors?				
	22	WESTON Subcontractors Excavating in WESTON White-Lined Area(s)?				
	23	If Yes to 22 Above, One-Call Agency Contacted to Determine if WESTON Subcontractor Can be Added to Existing Locate Ticket?				
<b>Excavation Activities</b>	24	Meeting and Site Walkover Conducted with Project Personnel? (Managers, Equipment Operators, Laborers, Competent Person, Excavation Observer, etc)				
	25	AHA and HASP Review Conducted With Personnel?				
	26	Do Site Activities Have Potential to Obliterate Utility Markings?				

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PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
<b>Excavation Activities</b>	27	If Yes to 26 Above, Have Provisions Been Made to Preserve Markings?				
	28	Has an Excavation Observer Been Designated to Monitor Excavation When Occurring within 3 Feet of the Buffer Zone?				
	29	Have Operator and Observer Reviewed Commands and Signals?				
	30	Has WESTON-Required Buffer Zone Been Marked on Either Side of Markings Placed by Locator?				
<b>Excavation Within Buffer Zone</b>	31	Is Excavation Within The Buffer Zone Absolutely Necessary?				
	32	If Yes to 31 Above, Can Non-Aggressive Methods Be Used For Excavation In The Buffer Zone? If Yes, Identify Appropriate Non-Aggressive Methods.				
	33	If No to 32 Above, Has a Buffer Zone Exemption Request Been Approved? If No, then Aggressive Methods May Not Be Used in The Buffer Zone.				
	34	If Yes to 33 Above, Has the Utility Been De-Energized, Purged, Verified/Tested, and Locked-Out? Or,  Has The Depth and Orientation of the Utility Been Adequately and Visually Determined Through The Use of Non-Aggressive Methods?				

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PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
Excavation Within Buffer Zone - Continued	35	<p>If Yes to 34 Above, Have All of The Following Conditions Been Met?</p> <p>For Utilities Containing Electrical Energy, Is The Depth of The Water Table Below The Depth of The Utility?</p> <p>Have Regulations Been Consulted to Determine Specific State Requirements Relative to Excavating in The Buffer Zone?</p> <p>Have Appropriate Physical Protection Measures Been Implemented to Prevent Equipment Contact With Utilities and to Prevent Damage to Utilities?</p> <p>If No to Any of The Above Conditions, Then Only Non-Aggressive Excavation Methods May Conducted in The Buffer Zone, Since The Conditions of The Exemption Have Not Been Satisfied.</p>				
Working Around Exposed Utilities	36	If Necessary, Have Provisions Been Made to Support the Utility During Work Activities?				
	37	Have Spoils Been Placed as far Away From the Excavation as Feasible?				
	38	Has the Utility Been De-Energized? (If Any Portion of the Buffer Zone around a Utility is Inside of the White-Lined Area)				
	39	Has the Isolation Point for the De-Energized Utility Been Physically Locked-Out?				
	40	If No to 39 Above, Has a Spotter Been Assigned to Monitor Isolation Point?				
	41	If Yes to 40 Above, Does the Spotter Have Adequate Communications? (Radio, Telephone, etc)				

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PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
<b>Working Around Exposed Utilities - Continued</b>	42	Has the Isolation Point Been Tagged?				
	43	Has Pre-Existing Damage to a Utility Been Discovered During Excavation?				
	44	If Yes to 43 Above, Has the One-Call Agency and/or Utility Owner Been Notified?				
<b>Damage Discovery</b>	45	If Yes to 43 Above, Have Photographs Been taken?				
	46	Have Utilities Been Encountered in Locations That Have Not Been Marked?				
	47	If Yes to 46 Above, Has the One-Call Agency or Other Locating Service Been Contacted?				
	48	If Yes to 46 Above, Has the PM and Appropriate DSM Been Notified?				
	49	If Yes to 46 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				
	50	Have Excavation Equipment Come In Contact With Underground utilities?				
	51	If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				
<b>Encountering or Contacting Underground Utilities</b>	52	If Yes to 50 Above, Were Intrusive Activities Immediately Curtailed?				
	53	If Yes to 50 Above, Has a Damage Determination Been Made From a Safe Distance?				
	54	If Yes to 50 Above, Has the Area Been Secured?				
<b>Encountering or Contacting Underground Utilities – Continued</b>	55	If Yes to 50 Above, Have Emergency Responders Been Notified?				

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PHASE	TASK		YES	NO	NA	COMMENTS Required if Response is No or NA. (Reference Item Number)
	55	If Yes to 50 Above, Has the Locating Agency and/or Utility Owner Been Notified?				
	56	If Yes to 50 Above, Have State and Local Reporting Requirements Been Met?				
	57	If Yes to 50 Above, Were Intrusive Activities Curtailed Until Inspection From Utility Owner, Orientation and Depth of Utility Was Determined and Marked, Permission From Emergency Responders Given?				
	58	If Yes to 50 Above, Has a WESTON Notification of Incident (NOI) Report Been Completed? (Include Photographs)				

CHECKLIST COMPLETED BY:

_____	_____	_____
NAME	SIGNATURE	DATE
_____	_____	_____
NAME	SIGNATURE	DATE

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### ATTACHMENT C UTILITY RESEARCH OPTIONS

In the course of determining and verifying underground utility location it is expected that a minimum of two resources will be used. As a means of assisting the search for sources, the following is offered.

#### Records Sources:


- ☐ Utility Section of the State DOT or other Public Agency
- ☐ One-Call Center
- ☐ Public Service Commission or similar organization
- ☐ County Clerks Office
- ☐ Landowner
- ☐ Internet or Computer database
- ☐ Visual Site Inspection
- ☐ Utility Owner

#### From the Above Collect:

- ☐ Previous construction plans in the area
- ☐ Conduit maps
- ☐ Direct-Buried Cable records
- ☐ Distribution maps
- ☐ Service record maps
- ☐ As-built and record drawings
- ☐ Field notes
- ☐ County, city, utility owner or other geographic information system database
- ☐ Circuit diagrams
- ☐ Oral histories (current or previous employees, residents)

#### Review Records and Obtain Information For:

- ☐ Indications of additional and/or other available records
- ☐ Duplicate information that lends credibility to data
- ☐ Any additional need for clarifications from owners/others

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## Informational Addendum - Overview of Underground Utility Detection Methods

### Induction Utility Locators

Induction utility locators operate by locating either a background signal or by locating a signal introduced into the utility line using a transmitter. There are three sources of background signals that can be located. A utility line can act like a radio antenna, transmitting electromagnetic signals that can be picked up with a receiver. AC power lines have a 50HZ signal associated with them. This signal occurs in all active AC power lines regardless of voltage. Utilities in close proximity to AC power lines or used as grounds may also have a 50HZ signal that can be located with a receiver. A signal can be indirectly induced onto a utility line by placing the transmitter above the line. Through a process of trial and error, the exact above position can be determined. A direct induced signal can be generated using an induction clamp. The inductor clamp induces a signal on specific utilities. This is the preferred method of tracing, where possible. By virtue of the closed loop, there is little chance of interference with the resulting signals. When access can be gained to a conduit, a flexible insulated trace wire can be used. The resulting signal loop can be traced. This is very useful for non-metallic conduits. Finally, these signals can be located horizontally on the surface using a receiver. The receiver is moved across the estimated location of the utility line until the highest signal strength is achieved. This is the approximate horizontal location of the utility. The receiver is then rotated until minimal signal strength is achieved. This will give the approximate orientation of the utility. Vertical depth, however, derived from this equipment is subject to gross error.

### Magnetic Locators


Ferrous Metal or Magnetic locators operate by indicating the relative amounts of buried ferrous metals. They have limited application to locating and identifying utility lines but can be very useful for locating underground storage tanks (UST's) and buried manhole covers or other subsurface objects with a large ferrous metal content.

### Electromagnetic Surveys

Electromagnetic survey equipment is used to locate metallic utilities. This method pulses the ground and records the signal retransmitted back to the unit from subsurface metal. Particularly useful for locating metal pipelines and conduit, this device also can help locate other subsurface objects such as UST's, buried foundations (that contain structural steel), and pilings and pile caps (that also contain steel).

### Ground Penetrating Radar

Ground Penetrating Radar (GPR) is an electromagnetic method that detects interfaces between subsurface materials with differing dielectric constants (a term that describes an electrical parameter of a material). The GPR system consists of an antenna, which houses the transmitter and receiver; and a profiling recorder, which processes the received signal and produces a graphic display of the data. The transmitter radiates repetitive short-duration EM signals into the earth from an antenna moving across

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the ground surface. Electromagnetic waves are reflected back to the receiver by interfaces between materials with differing dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant at the interface, the conductivity of the material, which the wave is traveling through, and the frequency of the signal. Subsurface features which may cause such reflections are: 1) natural geologic conditions such as changes in sediment composition, bedding and cementation horizons, voids, and water content; or 2) man-introduced materials or changes to the subsurface such as soil backfill, buried debris, tanks, pipelines, and utilities. The profiling recorder receives the signal from the antennae and produces a continuous cross section of the subsurface interface reflections, referred to as reflectors.


Depth of investigation of the GPR signal is highly site specific, and is limited by signal attenuation (absorption) of the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivity such as clays and brackish groundwater, and lowest in relatively low conductivity materials such as unsaturated sand or rock. Maximum depth of investigation is also dependent on antennae frequency and generally increases with decreasing frequency; however, the ability to identify smaller features is diminished as frequency decreases.

The various GPR antennas used are internally shielded from aboveground interference sources. Accordingly, the GPR signal is minimally affected by nearby aboveground conductive objects such as metal fences, overhead power lines, and vehicles.

A GPR survey is performed by towing an antenna across the ground along predetermined transect lines. The antennae is either pulled by a person or towed behind a vehicle. Preliminary GPR transects are performed over random areas of the site to calibrate the GPR equipment and characterize overall site conditions. The optimum time range settings are selected to provide the best combination of depth of investigation and data resolution for the subsurface conditions at the site. Ideally, the survey is performed along a pre-selected system of perpendicular or parallel transect lines. The configuration of the transect lines is designed based on the geometry and size of the target and the dimensions of the site. The beginning and ending points of the transect lines and grid intersection points, or nodes, are marked on the ground with spray paint or survey flags. A grid system is used to increase the probability of crossing the short axis of a target providing a more definitive signature in the data. The location of the antenna along a transect line is electronically marked on the cross section at each grid intersection point to allow correlation of the data to actual ground locations. The location of the targets can be marked on the ground surface using spray paint or survey flags.

### Acoustic Location Methods

Acoustic location methods generally apply to waterlines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing; (at joints, leaks, etc.) or to sounds introduced into the water main

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using a transducer. This method may have good identification results, but can be inaccurate. Acoustics can also being utilized to determine the location of plastic gas lines.

## **FLD 38 HAND AND POWER HAND TOOLS**

### **REFERENCES**

29 CFR 1926 Subpart I

29 CFR 1910 Subpart P

ANSI Standard A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools

### **RELATED FLDs**

*FLD 06 – Cold Stress*

*FLD 10 – Manual Lifting and Handling of Heavy Objects*

*FLD 16 – Pressure Systems: Compressed Gas Systems*

*FLD 35 – Electrical Safety*

### **INTRODUCTION**

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified through formal training or documented experience.

Like all tools, hand and power tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools, and power tools.

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable OSHA 1910/1926 requirement is prohibited. Any tools or equipment identified as unsafe or defective will be “tagged or locked-out.” Controls shall be applied rendering the unsafe or defective tool or equipment inoperable. Any damaged or defective equipment shall be removed from its place of operation. Weston shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment that may be furnished by employees.

Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations, which are out of the ordinary, unexpected, or not readily apparent. Tags shall be used until the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding, or other positive means of protection are being used.

### **GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS**

- Tools will be inspected prior to each use. Tools found to be unsafe will be tagged by the inspector “Do Not Use” and either repaired or removed from the site.
- Keep the work area clear of clutter.
- Keep the work area properly illuminated.
- Maintain and keep tools sharpened, oiled, and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.

- Repair or replace problem equipment immediately.
- Electric power tools must have a 3-wire cord plugged into a grounded receptacle, be double-insulated or powered by a low-voltage isolation transformer, and fitted with guards and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a chisel or a wrench as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.
- All hand-held power-driven tools must be equipped with one of the following: a constant pressure switch that shuts off the power upon release (e.g., circular saws, hand-held power drills, chain saws) or an on-off switch (e.g., routers, planers scrolls saws, jigsaws).
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained, and training must be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper ventilation provided when used in enclosed spaces.
- Bench grinders shall be properly grounded. Work rests must be kept at a distance not to exceed 1/8 inch from the grinding wheel surface.
- All persons using grinders or abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have grinding wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. Procedures for avoiding or minimizing risk include: using mechanical devices for lifting, following procedures in FLD 10 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 06.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced, as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.

- Handles designed for use on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

## **TORSION TOOLS**

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw
- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, or as punches or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to a base (e.g., work bench). When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

## **Screwdrivers**

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

## **Pliers**

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.

- Inspect pliers frequently to make certain that they are free of breaks or cracks.
- Pliers shall be kept free from grease and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt shall be snug but not tight.

## **Wrenches**

- Select the correct size of wrench for the job.
- Never use a piece of pipe or another wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.
- When using a wrench on a tight nut - first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and when possible apply force to the wrench with both hands while both feet are firmly placed. Always assume that you may lose your footing - check the place where you may fall for sharp objects.
- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease that would otherwise build up and cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hook and heel jaws when they become visibly worn.
- Position your hands so that your fingers will not be smashed between the wrench handle and the ground or other work surface; when breaking joints the wrench may slip or the joint may suddenly let go.

## **IMPACT TOOLS**

Impact tools include various types of hammers such as riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.

- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

## **Hammers**

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.
- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

## **CUTTING TOOLS**

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

## **Chisels**

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

## **Knives**

- Always cut away from the body.
- Keep hands and body clear of the knife stroke.
- Use a locking blade knife when possible.
- Keep blades sharp.
  - Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
  - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
  - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
  - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.
  - Remove knives from carry on luggage and place in checked baggage.

## **POWERED TOOLS**

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control ("dead-man switch") that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is no longer in contact with the tool. Safety clips, retainers, or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and other flanges are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. Weston Solutions, Inc. employees are not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

### **Extension Cords**

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

## **SPECIALTY TOOLS**

### **Pneumatic Powered Tools**

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

## **Powder-Actuated Tools**

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder-actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer's recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

## **RST 2 FLD 43A      ANIMALS**

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

### **Feral Animals**

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

### **Dangerous Wild Animals**

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

### **Venomous Snakes and Lizards**

#### Venomous Snakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:

**Hemotoxins** destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

**Neurotoxins** affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.

**Myotoxins** destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic

There are many highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

## **Geographical Listing of Venomous Snakes**

Following is a list of poisonous snakes by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

### **North America**

**Copperheads** (Broad-banded, Northern, Osage, Southern, Trans-Pecos)

**Rattlesnakes** Diamondback (eastern and western), Massasauga (eastern and western)

**Cottonmouth or water moccasin** (Eastern)

### **Prevention of Bites**

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

## **First-Aid**

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.
2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.
3. If the area of the bite begins to swell and change color, the snake was probably venomous.
4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.
5. Get medical help immediately.
6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).
  - DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
  - DO NOT apply a tourniquet.
  - DO NOT apply cold compresses to a snake bite.
  - DO NOT cut into a snake bite with a knife or razor.
  - DO NOT try to suction the venom by mouth.
  - DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
  - DO NOT give the person anything by mouth.
  - DO NOT raise the site of the bite above the level of the person's heart
  - Transport the victim to medical attention immediately

## **Animal Borne Diseases**

### **Rabies**

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

### **Questions and Answers about Rabies**

*Q. What is Rabies and how is it transmitted?*

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

*Q. What animals are most likely to be infected?*

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

*Q. How can you tell if an animal is rabies-infected?*

A. Rabies infection is not always apparent. Signs to look for in wild animals are over-aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

*Q. What should you do if bitten by an animal you suspect is infected with rabies?*

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

*Q. Is there a cure for rabies?*

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. **Rabies is not curable once symptoms or signs of rabies appear.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

## **Hantavirus**

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of “Hantavirus”-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculans*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with

activities that provide contact with infected rodents in rural/semi-rural areas. Hantavirus begins with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital.

## **Prevention**

Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural areas, the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

## **Plague**

Described under Insects (Fleas)

## **Anthrax**

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

**Cutaneous:** Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

**Inhalation:** Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

**Intestinal:** The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

## **Prevention**

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient's clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbe effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential—delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections

includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.

No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of *Bacillus anthracis* bacilli ranges from 0.5  $\mu\text{m}$  to 5.0  $\mu\text{m}$ . Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. [8] Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.

Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for in situ processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetra-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

## **Brucellosis**

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk include the Caribbean.

The disease is transmitted either through contaminated or untreated milk (and its derivatives) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.

Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.

The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably *B. abortus* strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

## **Prevention**

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

## **Q fever**

**Q fever** is caused by infection with *Coxiella burnetii*. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days. It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.

Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

### **Prevention**

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials.

### **Leptospirosis**

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

*Leptospira* organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

## **Prevention**

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.

Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

## **Ebola**

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. <sup>[2]</sup> The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and proteinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, and gorillas--both dead and alive.

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

## **Prevention**

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

## **Bird and Bat Borne or Enhanced Diseases**

**See also under Molds and Fungus**

### **Histoplasmosis**

Histoplasmosis is a fungal infection which enters the body through the lungs. The infection enters the body through the lungs. The fungus grows as a mold in the soil, and infection results from breathing in airborne particles. Soil contaminated with bird or bat droppings are known to have a higher concentration of histoplasmosis.

There may be a short period of active infection, or it can become chronic and spread throughout the body. Most people who do develop symptoms will have a flu-like syndrome (acute-fever, chills cough, and chest pain; chronic-chest pain, cough with blood, fever, shortness of breath, sweating) and lung complaints related to pneumonia or other lung involvement. Approximately 10% of the population will develop inflammation in response to the initial infection. This can affect the skin, bones or joints, or the lining of the heart (pericardium). These symptoms are not due to fungal infection of those body parts, but due to inflammation.

In a small number of patients, histoplasmosis may become widespread (disseminated) and involve the blood, brain, adrenal glands, or other organs. Very young or old are at a higher risk for

disseminated histoplasmosis. Symptoms include fevers, headache, neck stiffness, mouth sores, skin lesions.

Histoplasmosis may be prevented by reducing dust exposure in areas containing bird or bat droppings. Wear PPE and respirator when working within this environment. Institute work practices and dust control measures, i.e. moist/wet area, that eliminate or reduce dust generation which will reduce risks of infection and subsequent development of disease.

## Treatment

The main treatment for histoplasmosis is antifungal drugs. Amphotericin B, itraconazole, and ketoconazole are the usual treatments. Long-term treatment with antifungal drugs may be needed.

## Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacosis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.
- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured
- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure to

highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

## Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.

## **APPENDIX A**

### **Dangerous Animals - Wildlife Hazard Recognition and Protection**

#### **GENERAL**

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife.

These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

#### **ATTACHMENTS**

Attachments 1 and 2 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment.

#### **WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES**

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling, personnel involved in field activities in which encounters with wild animals may result, will take the following steps and will be equipped and trained, as set forth below.

#### **CLEAR THE AREA**

Evaluate and control the area before entry by

- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e. g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

#### **BASIC EQUIPMENT**

Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:

- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be

considered a hazardous material, check with airlines and hazardous material shippers for current information).

## **TRAINING**

Prior to entering and / or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:

- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as “bear watch”

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee’s training records.

## **VEHICLE SAFETY**

Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.

## **ATTACHMENT 1**

### **BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS**

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered are based on experience and conditions for field work. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

### **Bear Life History**

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear's hearing is probably better than ours, but not as keen as a dog's hearing. Their sight is probably comparable to that of a human. Black bears tend to favor forested habitats.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods.

In early summer, bears eat new grasses and forage as they develop in higher elevations. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.

Other summer foods for bears include grasses and ground squirrels. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.

During the late summer and early fall, bears move inland and consume large amounts of blueberries, and other succulent fruits. As the seasons progress towards winter, a bear's diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half. Black bears are sexually mature at age 2. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Black bears can live for 25 – 30 years, although most live less than 20 years.

### **BEAR AND HUMAN INTERACTIONS**

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear's life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into "human habitat." When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a "human sign," perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should

be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a “problem bear.” Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of “aversive conditioning.” These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

## **BLACK BEARS**

Black Bear Identification: Black bears are the smallest and most abundant of the bear species. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear’s nose is straight in profile, a brown bear’s is dished);
- Their claws (black bear’s claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear’s rump seems to be higher than its shoulders; a brown bear’s shoulders are usually higher than its rump); and

Typical Habitat: Black bears occupy a wide range of habitats, but seem to be most common in forested areas.

## **AVOIDING BEAR ENCOUNTERS WHEN**

- The Bear sees you but you do not know the bear is around: The bear will likely avoid detection people and will simply move away when they sense a human.
- You see a bear and it does not know you are there: Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.
- You see the bear and the bear sees you: Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear’s world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.
- You see a bear; the bear sees you and stands on its hind legs: This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure

out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.

- The bear sees you, recognizes you as a human, but continues to come towards you slowly: This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, black bears can climb trees.
- The bear recognizes you as a human and acts nervous or aggressive: When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast.
- The bear charges: If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are “bluff charges,” that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still.
- The bear attacks: When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.

### **AFTER A BEAR ENCOUNTER**

Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

- Bear Sprays: Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

The most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try.

## **ATTACHMENT 2**

### **HAZARDS AND PRECAUTIONS – DEER**

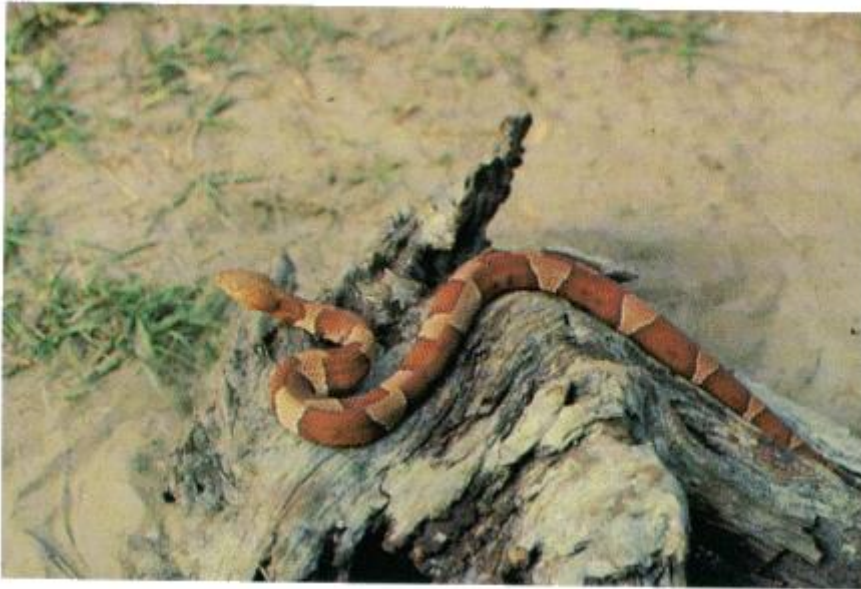
The following technical information, precautions, and guidelines for operations in which Deer may be encountered. The more the species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

### **WHITE-TAILED DEER**

The White-tailed deer found throughout the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.

## APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDS

### Americas



American copperhead



Cotton Mouth – East and Southeast US



Timber Rattlesnake – Eastern US

## **FLD 43 B     INSECTS**

### **Sting and Biting Insects**

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. These include the following:

- Bees (Honeybees, bumble bees, wasps, and hornets and wingless wasps)
- Scorpions
- Fire ants
- Spiders
- Ticks
- Deer Flies
- Mosquito
- Fleas
- Bed Bugs

### **Bees, Wasps, Hornets and Yellow Jackets**

The severity of an insect sting reaction varies from person to person. A normal reaction will result in pain, swelling and redness confined to the sting site. Simply disinfect the area (washing with soap and water will do) and apply ice to reduce the swelling.

A large local reaction will result in swelling that extends beyond the sting site. For example, a sting on the forearm could result in the entire arm swelling twice its normal size.

Although alarming in appearance, this condition is often treated the same as a normal reaction. An unusually painful or very large local reaction may need medical attention. Because this condition may persist for two to three days, antihistamines and corticosteroids are sometimes prescribed to lessen the discomfort.

Yellow jackets, hornets and wasps can sting repeatedly. Honeybees have barbed stingers that are left behind in their victim's skin. These stingers are best removed by a scraping action, rather than a pulling motion, which may actually squeeze more venom into the skin.

### **Scorpions (Caribbean)**

Scorpion stings are a major public health problem in many underdeveloped tropical countries. For every person killed by a poisonous snake, 10 are killed by a poisonous scorpion. In the United States, only 4 deaths in 11 years have occurred as a result of scorpion stings. Furthermore, scorpions can be found outside their normal range of distribution, ie, when they

accidentally crawl into luggage, boxes, containers, or shoes and are unwittingly transported home via human travelers.

Out of 1,500 scorpion species, 50 are dangerous to humans. Scorpion stings cause a wide range of conditions, from severe local skin reactions to neurologic, respiratory, and cardiovascular collapse.

Almost all of these lethal scorpions belong to the scorpion family called the Buthidae. The Buthidae are small to mid-size scorpions (0.8 inch to 5.0 inches) and normally uniformly colored without patterns or shapes. Poisonous scorpions also tend to have weak-looking pincers, thin bodies, and thick tails, as opposed to the strong heavy pincers, thick bodies, and thin tails seen in nonlethal scorpions. The lethal members of the Buthidae family include the genera of *Tityus* which can be found in the Caribbean.

A scorpion has a flattened elongated body and can easily hide in cracks. Scorpions are members of the Arachnid (spider) family. The bodies consist of 3-segments, they also have 4 pairs of legs, a pair of claws, and a segmented tail that has a poisonous spike at the end. Scorpions vary in size from 1-20 cm in length.

However, scorpions may be found outside their habitat range of distribution when inadvertently transported with luggage and cargo.

## **Prevention**

Preventive measures include awareness of scorpions, shaking out clothing and boots before putting them on looking before reaching into likely hiding places and wearing gloves, long sleeved shirts and pants.

## **Symptoms**

In mild cases, the only symptom may be a mild tingling or burning at site of sting.

In severe cases, symptoms may include:

- Eyes and ears - Double vision
- Lungs - Difficulty breathing, No breathing, Rapid breathing,
- Nose, mouth, and throat – Drooling, Spasm of the voice box, Thick-feeling tongue
- Heart and blood - High blood pressure, Increased or decreased heart rate, Irregular heartbeat
- Kidneys and bladder Urinary incontinence, Urine output, decreased
- Muscles and joints - Muscle spasms
- Nervous system – Paralysis, Random movements of head, eye, or neck, Restlessness, Seizures, Stiffness
- Stomach and intestinal tract - Abdominal cramps, Fecal incontinence
- Other -Convulsions

## **Treatment**

1. Recognize scorpion sting symptoms:
2. Wash the area with soap and water.
3. Apply a cool compress on the area of the scorpion sting. Ice (wrapped in a washcloth or other suitable covering) may be applied to the sting location for 10 minutes. Remove compress for 10 minutes and repeat as necessary.
4. Call the Poison Control Center. If you develop symptoms of a poisonous scorpion sting, go to the nearest emergency care facility.
5. Keep your tetanus shots and boosters current.

## **Fire Ants (Caribbean)**

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increase the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention

- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again

With these things in mind, and with the high probability of contact with stinging insects, use the following safe work practices:

- If a worker knows that he is hypersensitive to bee, wasp or hornet stings, inform the site Safety officer of this condition prior to participation in site activities
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the Site Safety officer if a stinging insect nest is located or suspected in the area
- Any nests located on site will be flagged off and site personnel will be notified of its presence
- If attacked, site personnel will immediately seek shelter and stay there. Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the safety officer who will observe for signs of allergic reaction

Treatment for fire ant stings is aimed at preventing secondary bacterial infection, which may occur if the pustule is scratched or broken. Clean the blisters with soap and water to prevent secondary infection. Do not break the blister. Topical corticosteroid ointments and oral antihistamines may relieve the itching associated with these reactions.

Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times

## Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous.

**Black Widow:** The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities

**Brown Recluse:** The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inches long. However, unlike the typical species, this spider has been encountered without a violin or “fiddle” shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the Arizona violin. These spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

#### **Brown Recluse Spider**



#### **Black Widow Spider**



First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing

Seek immediate medical attention

### **Sensitivity Reaction to Insect Stings or Bites**

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit (e.g., Epi-Kit). First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

### **Insect Borne Diseases**

Diseases that are spread by insects include the following: Lyme Disease (tick); Bubonic and other forms of Plague (fleas); Malaria, West Nile Virus and Equine Encephalitis (mosquito).

### **Tick Borne Diseases**

Lyme disease is the second most rapidly spreading disease in the U.S.

### **Lyme Disease**

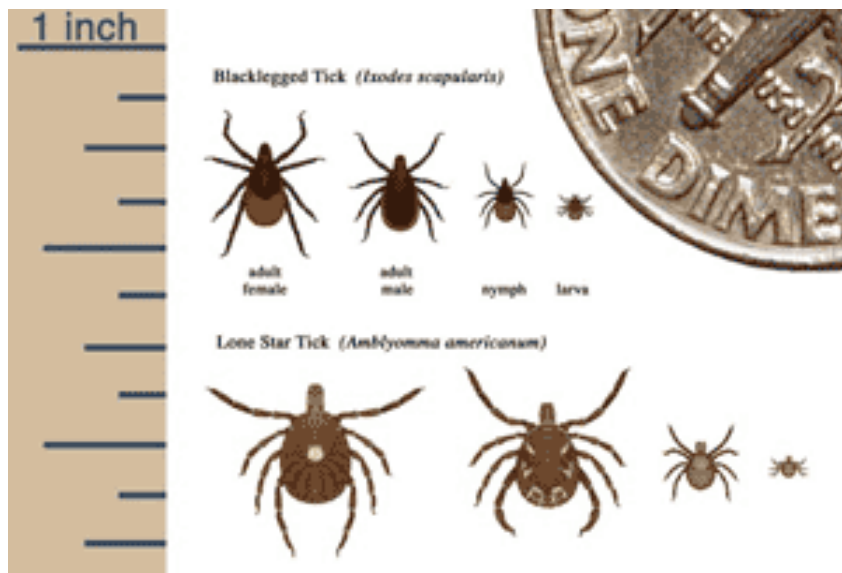
#### **1. Facts**

Definition:

- Bacterial infection transmitted by the bite of an infected black-legged tick more popularly known as the deer tick.
- Prevalence (nationwide and other countries).
- Three stages/sizes of deer ticks:
  - Larvae
  - Nymph
  - Adult

Tick season is May through October.

Not all ticks transmit Lyme disease (Black legged or deer tick [upper] compared to the Lone Star tick [lower])



- Ticks must be attached for several hours before Lyme disease can be transmitted.
- Being bitten by a tick does not mean you will get Lyme disease.

## 2. Prevention and Protection:

- Wear light-colored, tight-knit clothing.
- Wear long pants and long-sleeved shirts.
- Tuck pant legs into shoes or boots.
- Wear a hat.
- Use insect repellent containing DEET ((follow manufacturer's instructions for use).
- Check yourself daily for ticks after being in grassy, wooded areas.
- Request information from the Health and Safety Medical Section regarding Lyme Disease.

## 3. If Bitten:

- Remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick.
- Wash your hands and dab the bite with an antiseptic.

- Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick and the spot on your body where you were bitten.
- Monitor the bite for any signs of infection or rash.

#### 4. Symptoms:

Early Signs (may vary from person to person)

- Expanding skin rash.
- Flu-like symptoms during summer or early fall that include the following:
  - Chills, fever, headache, swollen lymph nodes.
  - Stiff neck, aching joints, and muscles.
  - Fatigue.
- Later signs
  - Nervous system problems.
  - Heart problems.
  - Arthritis, especially in knees.

#### 5. Upon Onset of Symptoms:

- Notify your Safety Officer (SO) and your supervisor.

### **Ehrlichiosis**

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. These diseases are caused by the organisms in the genus *Ehrlichia*. Worldwide, there are currently four ehrlichial species that are known to cause disease in humans.

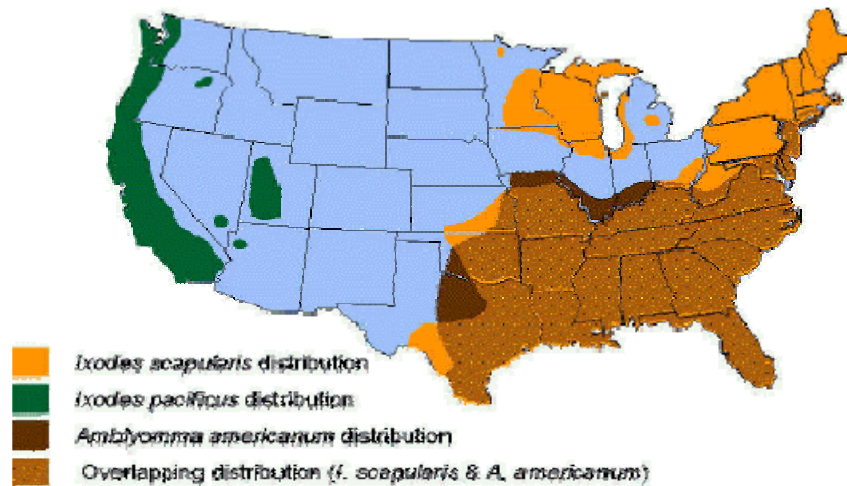
In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*) and the blacklegged tick (*Ixodes scapularis*) are known vectors of ehrlichiosis.

The symptoms of ehrlichiosis may resemble symptoms of various other infectious and non-infectious diseases. These clinical features generally include fever, headache, fatigue, and muscle aches. Other signs and symptoms may include nausea, vomiting, diarrhea, cough, joint pains, confusion, and occasionally rash. Symptoms typically appear after an incubation period of 5-10 days following the tick bite. It is possible that many individuals who become infected with ehrlichiae do not become ill or they develop only very mild symptoms.

Most cases of ehrlichiosis are reported within the geographic distribution of the vector ticks (see map below). Occasionally, cases are reported from areas outside the distribution of the tick vector. In most instances, these cases have involved persons who traveled to areas where the diseases are endemic, and who had been bitten by an infected tick and developed symptoms after

returning home. Therefore, if you traveled to an ehrlichiosis-endemic area 2 weeks prior to becoming ill, you should tell your doctor where you traveled.

**Figure 20. Areas where human ehrlichiosis may occur based on approximate distribution of vector tick species**



A diagnosis of ehrlichiosis is based on a combination of clinical signs and symptoms and confirmatory laboratory tests. Blood samples can be sent to a reference laboratory for testing. However, the availability of the different types of laboratory tests varies considerably. Other laboratory findings indicative of ehrlichiosis include low white blood cell count, low platelet count, and elevated liver enzymes.

Ehrlichiosis is treated with a tetracycline antibiotic, usually doxycycline.

Very little is known about immunity to ehrlichial infections. Although it has been proposed that infection with ehrlichiae confers long-term protection against reinfection, there have been occasional reports of laboratory-confirmed reinfection. Short-term protection has been described in animals infected with some *Ehrlichia* species and this protection wanes after about 1 year. Clearly, more studies are needed to determine the extent and duration of protection against reinfection in humans.

Limiting exposure to ticks reduces the likelihood of infection in persons exposed to tick-infested habitats. Prompt careful inspection of your body and removal of crawling or attached ticks is an important method of preventing disease. It may take 24–48 hours of attachment before microorganisms are transmitted from the tick to you.

### **Preventive measures - Follow protection protocols for Lyme disease**

#### **Babesiosis**

Babesiosis is an intraerythrocytic parasitic infection caused by protozoa of the genus *Babesia* and transmitted through the bite of the *Ixodes* tick, the same vector responsible for transmission of Lyme disease. While most cases are tick-borne, transfusion and transplacental transmission

have been reported. In the United States, babesiosis is usually an asymptomatic infection in healthy individuals. Several groups of patients become symptomatic, and, within these subpopulations, significant morbidity and mortality occur. The disease most severely affects patients who are elderly, immunocompromised, or asplenic. Among those symptomatically infected, the mortality rate is 10% in the United States.

The primary vectors of the parasite are ticks of the genus *Ixodes*. In the United States, the black-legged tick, *Ixodes scapularis* (also known as *Ixodes dammini*) is the primary vector for the parasite. The *Ixodes* tick vector for *Babesia* is the same vector that locally transmits *Borrelia burgdorferi*, the agent implicated in Lyme disease. The primary US animal reservoir is the white-footed mouse, *Peromyscus leucopus*. Additionally, white-tailed deer serve as transport hosts for the adult tick vector, *I. scapularis*.

The Ixodid ticks ingest *Babesia* during feeding from the host, multiply the protozoa in their gut wall, and concentrate it in their salivary glands. The tick inoculates a new host when feeding again. The parasite then infects red blood cells (RBCs) and differentiated and undifferentiated trophozoites are produced. The former produce 2-4 merozoites that disrupt the RBC and go on to invade other RBCs. This leads to hemolytic anemia, thrombocytopenia, and atypical lymphocyte formation. Alterations in RBC membranes cause decreased conformability and increased red cell adherence, which can lead to development of acute respiratory distress syndrome (ARDS) among those severely affected.

The signs and symptoms mimic malaria and range in severity from asymptomatic to septic shock.

Symptoms include: Generalized weakness, fatigue, depression, fever, anorexia and weight loss, CNS - Headache, photophobia, neck stiffness, altered sensorium, pulmonary - Cough, shortness of breath, GI - Nausea, vomiting, abdominal pain, Musculoskeletal - Arthralgia and myalgia and Renal - Dark urine

## **Prevention**

Prevention measures are the same as for Lyme and other insect borne diseases

## **Tularemia**

**Tularemia** (also known as "rabbit fever") is a serious infectious disease caused by the bacterium *Francisella tularensis*. The disease is endemic in North America. The primary vectors are ticks and deer flies, but the disease can also be spread through other arthropods. Animals such as rabbits, prairie dogs, hares and muskrats serve as reservoir hosts.

Depending on the site of infection, tularemia has six characteristic clinical syndromes: ulceroglandular, glandular, oropharyngeal, pneumonic, oculoglandular, and typhoidal.

The disease has a very rapid onset, with headache, fatigue, dizziness, muscle pains, loss of appetite and nausea. Face and eyes redden and become inflamed. Inflammation spreads to the

lymph nodes, which enlarge and may suppurate (mimicking bubonic plague). Lymph node involvement is accompanied by a high fever. Death may result.

*Francisella tularensis* is one of the most infective bacteria known; fewer than ten organisms can cause disease leading to severe illness. The bacteria penetrate into the body through damaged skin and mucous membranes, or through inhalation. Humans are most often infected by tick bite or through handling an infected animal. Ingesting infected water, soil, or food can also cause infection. Tularemia can also be acquired by inhalation; hunters are at a higher risk for this disease because of the potential of inhaling the bacteria during the skinning process. Tularemia is not spread directly from person to person.

No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellent to prevent tick bites.

### **Prevention**

No vaccine is available to the general public. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellent to prevent tick bites.

### **Other diseases primarily transmitted by Arthropods (Ticks, mites, lice etc.)**

**Typhus** (Not to be confused with Typhoid Fever [discussed in these FLDs])

*For the unrelated disease caused by *Salmonella typhi*, see Typhoid fever. For the unrelated disease caused by *Salmonella paratyphi*, please refer to Paratyphoid fever. For the monster of Greek mythology, see Typhus (monster).*

**Typhus** is any one of several similar diseases caused by louse-borne bacteria. The name comes from the Greek *typhos*, meaning smoky or lazy, describing the state of mind of those affected with typhus. *Rickettsia* is endemic in rodent hosts, including mice and rats, and spreads to humans through mites, fleas and body lice. The arthropod vector flourishes under conditions of poor hygiene, such as those found in prisons or refugee camps, amongst the homeless, or until the middle of the 20th century, in armies in the field. In tropical countries, typhus is often mistaken for dengue fever.

### **Endemic typhu**

Endemic typhus (also called "flea-borne typhus" and "murine typhus" or "rat flea typhus") is caused by the bacteria *Rickettsia typhi*, and is transmitted by the flea that infest rats. Symptoms of endemic typhus include headache, fever, chills, myalgia, nausea, vomiting, and cough.

Endemic typhus is highly treatable with antibiotics. Most people recover fully, but death may occur in the elderly, severely disabled or patients with a depressed immune system.

## **Encephalitis Arboviral Encephalitides**

### **Perspectives**

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States, all of which are transmitted by mosquitoes. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

**There is expanded discussion of several of these diseases (West Nile and Eastern Equine Encephalitis elsewhere in this document. A more general discussion is found in Attachment 2.**

## Mosquito Borne Diseases

### Malaria

**Malaria** is a mosquito-borne disease caused by a parasite. Four kinds of malaria parasites can infect humans: *Plasmodium falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*.



People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. Each year 350-500 million cases of malaria occur worldwide. Infection with any of the malaria species can make a person feel very ill; infection with *P. falciparum*, if not promptly treated, may be fatal. Although malaria can be a fatal disease, illness and death from malaria are largely preventable.

This sometimes fatal disease can be prevented and cured. Bed nets, insecticides, and anti-malarial drugs are effective tools to fight malaria in areas where it is transmitted. Travelers to a malaria-risk area should avoid mosquito bites and take a preventive anti-malarial drug. Malaria was eradicated from the United States in the early 1950s. However, malaria is common in many developing countries and travelers who visit these areas risk getting malaria.

Returning travelers and arriving immigrants could also reintroduce the disease in the United States if they are infected with malaria when they return. The mosquito that transmits malaria, *Anopheles*, is found throughout much of the United States. If local mosquitoes bite an infected person, those mosquitoes can, in turn, infect local residents (*introduced malaria*).

Because the malaria parasite is found in red blood cells, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her fetus before or during delivery ("congenital" malaria).

Malaria is not transmitted from person to person like a cold or the flu. You cannot get malaria from casual contact with malaria-infected people.

## **Prevention and control**

You can prevent malaria by:

- keeping mosquitoes from biting you, especially at night
- taking anti-malarial drugs to kill the parasites
- eliminating places where mosquitoes breed
- spraying insecticides on walls to kill adult mosquitoes that come inside
- sleeping under bed nets - especially effective if they have been treated with insecticide,
- wearing insect repellent and long-sleeved clothing if out of doors at night

The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a malaria-risk area) the test should be performed without delay.

The disease should be treated early in its course, before it becomes severe and poses a risk to the patient's life. Several good anti-malarial drugs are available, and should be administered early on. The most important step is to think about malaria, so that the disease is diagnosed and treated in time.

## **West Nile Virus**

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent WNV.

The easiest and best way to avoid WNV is to prevent mosquito bites.

- When you are outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.
- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.
- Make sure you have good screens on your windows and doors to keep mosquitoes out.
- Get rid of mosquito breeding sites by emptying standing water from buckets, barrels and drainage ditches.

About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Up to 20 percent of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all. Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

WNV is not spread through casual contact such as touching or kissing a person with the virus.

Symptoms typically develop between 3 - 14 days after being bitten by an infected mosquito.

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Milder WNV illness improves on its own, and people do not necessarily need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

## **Equine Encephalitis**

Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States.

EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from 3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes.

Many species of mosquitoes can become infected with EEEV. The most important mosquito species in maintaining the bird-mosquito transmission cycle is *Culiseta melanura*, which reproduces in freshwater hardwood swamps. *Culiseta melanura*, however, is not considered to be an important vector of EEEV to horses or humans because it feeds almost exclusively on birds.

Transmission to horses or humans requires mosquito species capable of creating a “bridge” between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be “dead-end” hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes).

Eastern equine encephalitis virus is a member of the family Togaviridae, genus *Alphavirus* closely related to Western equine encephalitis virus and Venezuelan equine encephalitis virus

Many persons infected with EEEV have no apparent illness. In those persons who do develop illness, symptoms range from mild flu-like illness to inflammation of the brain, coma and death.

The mortality rate from EEE is approximately one-third, making it one of the most deadly mosquito-borne diseases in the United States.

There is no specific treatment for EEE; optimal medical care includes hospitalization and supportive care (for example, expert nursing care, respiratory support, prevention of secondary bacterial infections, and physical therapy, depending on the situation).

Approximately half of those persons who survive EEE will have mild to severe permanent neurologic damage.

Incidence rate includes:

- Approximately 220 confirmed cases in the US 1964-2004, Average of 5 cases/year, with a range from 0-15 cases
- States with largest number of cases includes New Jersey.
- EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic Coast states and the Great Lakes region.

- Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited.

### **Risk Groups:**

- Residents of and visitors to endemic areas (areas with an established presence of the virus)
- People who engage in outdoor work and recreational activities in endemic areas.
- Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe EEE when infected with the virus.

### **Prevention**

- A vaccine is available to protect equines.
- People should avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active (some bridge vectors of EEEV are aggressive day-biters), and removing standing water that can provide mosquito breeding sites.
- There are laboratory tests to diagnosis EEEV infection including serology, especially IgM testing of serum and cerebrospinal fluid (CSF), and neutralizing antibody testing of acute- and convalescent-phase serum.

### **Meningitis**

Meningitis is a viral disease that can affect the central nervous system that is transmitted through the bite from an infected mosquito.

Symptoms can be nonexistent or severe and flu-like, with fever, chills, tiredness, headache, nausea and vomiting. If not treated promptly the disease can be fatal.

### **Prevention**

- A vaccine is available. It's 80% effective after a single dose and 97.5% effective after a second dose.

Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

### **Deer Flies (See Tularemia above)**

## **Fleas**

Flea is a common name for insects of the order Siphonaptera which are wingless insects with mouthparts adapted for piercing skin and sucking blood. Fleas are external parasites, living by hematophagy off the blood of mammals (including humans). Some species include the cat flea (*Ctenocephalides felis*), dog flea (*Ctenocephalides canis*), and human flea (*Pulex irritans*).

Fleas are small (1.5 to 3.3 mm) long, agile, dark-colored, wingless insect with tube-like mouth parts adapted to feeding on the blood of their hosts. Their legs are long, with the hind pair well adapted for jumping. A flea can jump vertically up to seven inches and horizontally up to 13 inches. The flea body is hard, polished, and covered with many hairs and short spines directed backwards which assists its movement on the host. The body is able to withstand great pressure. Hard squeezing between the fingers is not normally sufficient to kill a flea.

Fleas lay tiny white oval-shaped eggs. The larva is small, pale, has bristles covering its worm-like body, lacks eyes, and has mouthparts adapted to chewing.

Fleas can cause medical problems include flea allergy dermatitis, secondary skin irritations and, in extreme cases, anemia, tapeworms, and stomach flu. Fleas can transmit murine typhus (endemic typhus) fever among animals and from animal to humans. Fleas can also transmit bubonic plague. Tapeworms normally infest in human severe cases. Although the bite is rarely felt, it is the resulting irritation caused by the flea salivary secretions that varies among individuals. Some result in a severe reaction including a general rash or inflammation resulting in secondary infections caused by scratching the irritated skin. Most bites are found on the feet and legs with the formation of small, hard, red, slightly raised itching spots with a single puncture point in the center of each spot.

### **Treatment**

Flea bites can be treated with anti-itch creams, usually antihistamines or hydrocortisone.

## **Bed Bugs**

Bed bugs are small parasitic insects that feed on human blood. A number of health effects may occur due to bed bugs including skin rashes, prominent blisters, psychological effects and allergic symptoms. Diagnosis involves finding the bed bugs and the occurrence of compatible symptoms. Treatment is otherwise symptomatic.

Adult bed bugs are reddish-brown, flattened, oval and wingless. Bed bugs have microscopic hairs that give them a banded appearance. Adults grow to 4-5mm in length and 1.5-3 mm wide. A bed bug pierces the skin of its host with two hollow feeding tubes shaped like tongues. The one tube injects its saliva, which contains anticoagulants and anesthetics, while the other draws blood of its host. After feeding for approximately five minutes, the bug returns to its hiding place. Although bed bugs can live for a year without feeding, they normally feed every five to ten days.

Eradication of bed bugs frequently requires a combination of pesticide and non-pesticide approaches. Pyrethroids, dichlorvos, and malathion have historically been effective. Mechanical approaches include vacuuming and heat treating or wrapping mattresses have also been recommended.

**ATTACHMENT 1**  
**RICKETTSIAL INFECTIONS**

## **Rickettsial Infections**

### **Description**

Many species of *Rickettsia* can cause illnesses in humans (Table below). The term “rickettsiae” conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Ehrlichia*, *Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host. However, sennetsu fever is acquired following consumption of raw fish products. The clinical severity and duration of illnesses associated with different rickettsial infections vary considerably, even within a given antigenic group. Rickettsioses range in severity from diseases that are usually relatively mild (cat scratch disease) to those that can be life-threatening (murine typhus) and they vary in duration from those that can be self-limiting to chronic (Q fever and bartonellosis) or recrudescent (Brill-Zinsser disease). Most patients with rickettsial infections recover with timely use of appropriate antibiotic therapy.

Travelers may be at risk for exposure to agents of rickettsial diseases if they engage in occupational or recreational activities which bring them into contact with habitats that support the vectors or animal reservoir species associated with these pathogens.

The geographic distribution and the risks for exposure to rickettsial agents are described below and in the Table below.

### **Trench Fever**

Trench fever, which is caused by *Bartonella quintana*, is transmitted from one person to another by the human body louse. Contemporary outbreaks of both diseases are rare in most developed countries and generally occur only in communities and populations in which body louse infestations are frequent, especially during the colder months when louse-infested clothing is not laundered. Foci of trench fever have also been recognized among homeless populations in urban centers of industrialized countries. Travelers who are not at risk of exposure to body lice or to persons with lice are unlikely to acquire these illnesses. However, health-care workers who care for these patients may be at risk for acquiring louse-borne illnesses through inhalation or inoculation of infectious louse feces into the skin or conjunctiva.

## Murine Typhus

Murine typhus, which is caused by infection with *Rickettsia typhi*, is transmitted to humans by rat fleas, particularly during exposure in rat-infested buildings (3). Flea-infested rats can be found throughout the year in humid tropical environments, especially in harbor or riverine environments. In temperate regions, they are most common during the warm summer months.

Travelers who participate in outdoor activities in grassy or wooded areas (e.g., trekking, camping, or going on safari) may be at risk for acquiring tick-borne illnesses, including those caused by *Rickettsia*, and *Ehrlichia* species (see below).

**TABLE Epidemiologic features and symptoms of rickettsial diseases**

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
Typhus fevers	Murine typhus	<i>R. typhi</i>	As above, generally less severe	Rat flea	Rats, mice	Worldwide
Spotted fevers						
Coxiella	Q fever	<i>Coxiella burnetii</i>	Fever, headache, chills, sweating, pneumonia, hepatitis, endocarditis	Most human infections are acquired by inhalation of infectious aerosols; tick	Goats, sheep, cattle, domestic cats, other	Worldwide
Bartonella	Cat-scratch disease	<i>Bartonella henselae</i>	Fever, adenopathy, neuroretinitis, encephalitis	Cat flea	Domestic cats	Worldwide
	Trench fever	<i>B. quintana</i>	Fever, headache, pain in shins, splenomegaly, disseminated rash	Human body louse	Humans	Worldwide
Ehrlichia	Ehrlichiosis	<i>Ehrlichia chaffeensis</i> <sup>#</sup>	Fever, headache, nausea, occasionally rash	Tick	Various large and small mammals, including deer and rodents	Worldwide

This represents only a partial list of symptoms. Patients may have different symptoms or only a few of those listed.

## Anaplasmosis and Ehrlichiosis

Human ehrlichiosis and anaplasmosis are acute tick-borne diseases, associated with the lone star tick, *Amblyomma americanum*, and *Ixodes* ticks, respectively. Because one tick may be infected with more than one tick-borne pathogen (e.g. *Borrelia burgdorferi*, the causative agent of Lyme disease, or various *Babesia* species, agent of human babesiosis), patients may be present with

atypical clinical symptoms that complicate treatment. Ehrlichioses and anaplasmosis are characterized by infection of different types of leukocytes, where the causative agent multiplies in cytoplasmic membrane-bound vacuole called morulae. Morulae can sometimes be detected in Giemsa-stained blood smears.

## **Q FEVER**

Q fever occurs worldwide, most often in persons who have contact with infected goat, sheep, cat and cattle, particularly parturient animals (especially farmers, veterinarians, butchers, meat packers, and seasonal workers). Travelers who visit farms or rural communities can be exposed to *Coxiella burnetii*, the agent of Q fever, through airborne transmission (via animal-contaminated soil and dust) or less commonly through consumption of unpasteurized milk products or by exposure to infected ticks. These infections may initially result in only mild and self-limiting influenza-like illnesses, but if untreated, infections may become chronic, particularly in persons with preexisting heart valve abnormalities or with prosthetic valves. Such persons can develop chronic and potentially fatal endocarditis.

## **Cat-Scratch Disease**

Cat-scratch disease is contracted through scratches and bites from domestic cats, particularly kittens, infected with *Bartonella henselae*, and possibly from their fleas (3, 4). Exposure can therefore occur wherever cats are found.

## **Symptoms**

Clinical presentations of rickettsial illnesses vary (Table above), but common early symptoms, including fever, headache, and malaise, are generally nonspecific. Illnesses resulting from infection with rickettsial agents may go unrecognized or are attributed to other causes. Atypical presentations are common and may be expected with poorly characterized non-indigenous agents, so appropriate samples for examination by specialized reference laboratories should be obtained. A diagnosis of rickettsial diseases is based on two or more of the following: 1) clinical symptoms and an epidemiologic history compatible with a rickettsial disease, 2) the development of specific convalescent-phase antibodies reactive with a given pathogen or antigenic group, 3) a positive polymerase chain reaction test result, 4) specific immunohistologic detection of rickettsial agent, or 5) isolation of a rickettsial agent. Ascertaining the likely place and the nature of potential exposures is particularly helpful for accurate diagnostic testing.

## Prevention

With the exception of the louse-borne diseases described above, for which contact with infectious arthropod feces is the primary mode of transmission (through autoinoculation into a wound, conjunctiva, or inhalation), travelers and health-care providers are generally not at risk for becoming infected via exposure to an ill person. Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Q fever and *Bartonella* group diseases may pose a special risk for persons with abnormal or prosthetic heart valves, and *Rickettsia*, *Ehrlichia*, and *Bartonella* for persons who are immunocompromised.

## **ATTACHMENT 2**

### **ENCEPHALITIS ARBOVIRAL ENCEPHALITIDES**

## Encephalitis Arboviral Encephalitides

### Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus *Alphavirus*, *Flaviviridae*, and *Bunyaviridae*).

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution which is transmitted by mosquitoes. Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

The majority of human infections is asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache, myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis.

Experimental studies have shown that invasion of the central nervous system (CNS), generally follows initial virus replication in various peripheral sites and a period of viremia. Viral transfer from the blood to the CNS through the olfactory tract has been suggested. Because the arboviral encephalitides are viral diseases, antibiotics are not effective for treatment and no effective antiviral drugs have yet been discovered.

## Prevention

Arboviral encephalitis can be prevented in two major ways: personal protective measures and public health measures to reduce the population of infected mosquitoes. Personal measures include reducing time outdoors particularly in early evening hours, wearing long pants and long sleeved shirts and applying mosquito repellent to exposed skin areas. Public health measures often require spraying of insecticides to kill juvenile (larvae) and adult mosquitoes.

Selection of mosquito control methods depends on what needs to be achieved; but, in most emergency situations, the preferred method to achieve maximum results over a wide area is aerial spraying. In many states aerial spraying may be available in certain locations as a means to control nuisance mosquitoes. Such resources can be redirected to areas of virus activity. When aerial spraying is not routinely used, such services are usually contracted for a given time period. Financing of aerial spraying costs during large outbreaks is usually provided by state emergency contingency funds. Federal funding of emergency spraying is rare and almost always requires a federal disaster declaration. Such disaster declarations usually occur when the vector-borne disease has the potential to infect large numbers of people, when a large population is at risk and when the area requiring treatment is extensive. Special large planes maintained by the United States Air Force can be called upon to deliver the insecticide(s) chosen for such emergencies. Federal disaster declarations have relied heavily on risk assessment by the CDC.

There are no commercially available human vaccines for these U.S. diseases.

## **Powassan Encephalitis**

Powassan (POW) virus is a flavivirus and currently the only well documented tick-borne transmitted arbovirus occurring in the United States and Canada. Recently a Powassan-like virus was isolated from the deer tick, *Ixodes scapularis*. Its relationship to POW and its ability to cause human disease has not been fully elucidated. POW's range in the United States is primarily in the upper tier States. In addition to isolations from man, the virus has been recovered from ticks (*Ixodes marxi*, *I. cookei* and *Dermacentor andersoni*) and from the tissues of a skunk (*Spilogale putorius*). It is a rare cause of acute viral encephalitis. POW virus was first isolated from the brain of a 5-year-old child who died in Ontario in 1958. Patients who recover may have residual neurological problems.

## **Other Arboviral Encephalitides**

Many other arboviral encephalitides occur throughout the world. Most of these diseases are problems only for those individuals traveling to countries where the viruses are endemic.

## **West Nile Encephalitis**

Discussed elsewhere in this document

## FLD 43 D HAZARDOUS PLANTS

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

### Plants That Cause Skin and Tissue Injury

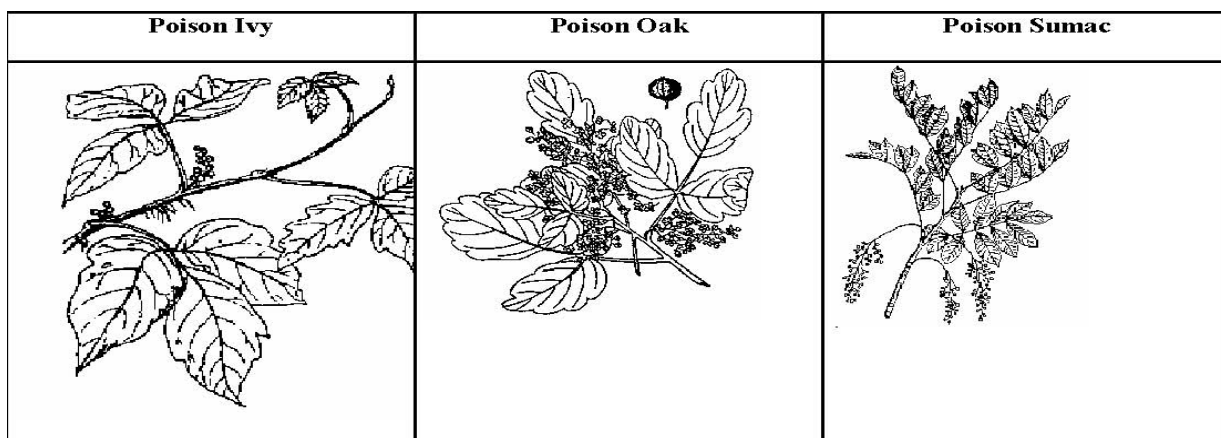
Contact with sharp leaves and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes shall report immediately for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

### Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas.

**Poison Ivy/Poison Oak/Poison Sumac**



The reaction associated with exposure to these plants will generally cause the following signs and symptoms:

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
- Reddening, swelling, itching and burning at the site of contact
- Pain, if the reaction is severe
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin

If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:

- Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site
- Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday
- Avoid contact with, and wash on a daily basis, contaminated tools, equipment and clothing
- Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

### **Plants That are Poisonous**

There are a number of plants worldwide beside poison ivy, oak and sumac which have poisonous properties. In many cases consumption of these plants or parts of these plants can result in poisoning. In other cases, contact with the plants may be poisonous. The following is a listing with pertinent information on poisonous properties and locations of a number of plants.

In general, when working in the outdoors or where you may come in contact with household plants or where your families may come in contact with these plants, it is important that as soon as possible after contact the area or areas should be thoroughly washed and hands must be thoroughly washed before eating drinking, smoking or any other hand to mouth contact.

In keeping with our 24/7 BBS concept, it is important to remember that children are particularly vulnerable to many of the poisonous parts of these plants. Many of these poisonous parts resemble non-poisonous food items such as berries and are attractive.

As with most lists there is extensive information but the list may not include all poisonous plants.

It is important to remember that this document is a starting point to be supplemented with local information. The majority of this information is from a list found in Wikipedia an on line Dictionary readily accessible via Google. The website has pictures of these plants as well as links to other information sources.

# POISONOUS PLANTS

From Wikipedia,

This is a list of plants containing poisonous parts that pose a serious risk of illness, injury, or death to humans.

## Poisonous Food Plants

- Apple (*Malus domestica*) **Found worldwide in cooler climates.** Seeds contain cyanogenic glycosides; although the amount found in most apples won't kill a person.
- Cherry (*Prunus cerasus*), as well as other species (*Prunus spp*) such as peach (*Prunus persica*), plum (*Prunus domestica*), almond (*Prunus dulcis*) and apricot (*Prunus armeninaca*). **There are around 430 species of *Prunus*, spread throughout the northern temperate regions of the globe.** Leaves and seeds contain cyanogenic glycosides
- Rhubarb (*Rheum rhaponticum*) **Found worldwide.** Leaves, but not stems, contain oxalic acid salts, causing kidney disorders, convulsions, and coma. Rarely fatal.
- Tomato (*Solanum lycopersicum*) **Found worldwide.** Foliage and vines contain alkaloid poisons which cause digestive upset and nervous excitement.

## Other Poisonous Plants

- Autumn crocus. **Found in North America.** The bulbs are poisonous and cause nausea, vomiting, diarrhea. **Can be fatal.**
- Azalea **Found Worldwide.** All parts of the plant are poisonous and cause nausea, vomiting, depression, breathing difficulties, and coma. Rarely fatal.
- Bittersweet nightshade **Naturalized in North America.** All parts are poisonous, containing solanine and causing fatigue, paralysis, convulsions and diarrhea. Rarely fatal.
- Bleeding heart / Dutchman's breeches. **Found in North America.** Leaves and roots are poisonous and cause convulsions and other nervous symptoms.
- Black locust. **Naturalized in North America.** Pods are toxic
- Caladium / Elephant ear. **Ornamental plants in North America.** All parts of the plant are poisonous. Symptoms are generally irritation, pain, and swelling of tissues. If the mouth or tongue swells, breathing may be fatally blocked.

- Castor Oil Plant (*Ricinus communis*) Castor Oil Plant. **Found Worldwide.** The phytotoxin is **ricin**, an extremely toxic water soluble protein, which is concentrated in the seed. Also present are ricinine, an alkaloid, and an irritant oil. Causes burning in mouth and throat, convulsions, and is **often fatal**.
- Daffodil. **Found worldwide.** The bulbs are poisonous and cause nausea, vomiting, and diarrhea. **Can be fatal.**
- Daphne (*Daphne sp.*) **Ornamental plant worldwide.** The berries (either red or yellow) are poisonous, causing burns to mouth and digestive tract, followed by coma. **Often fatal.**
- Darnel/Poison Ryegrass (*Lolium temulentum*) **Usually grows in the same production zones as wheat and is considered a weed.** The seeds and seed heads of this common garden weed may contain the alkaloids temuline and loline. Some experts also point to the fungus ergot or fungi of the genus endoconidium both of which grow on the seed heads of rye grasses as an additional source of toxicity.
- Deadly nightshade (*Atropa belladonna*) **Naturalized in parts of North America.** All parts of the plant contain the toxic alkaloid atropine. The young plants and seeds are especially poisonous, causing nausea, muscle twitches, paralysis; **often fatal.**
- Dumbcane / dieffenbachia. **Found in tropical areas and popular as house plants.** All parts are poisonous, causing intense burning, irritation, and immobility of the tongue, mouth, and throat. Swelling can be severe enough to block breathing leading to death.
- Ivy. **Native to North America** where winters are not severe. The leaves and berries are poisonous, causing stomach pains, labored breathing, possible coma.
- Jerusalem cherry **United States** All parts, especially the berries, are poisonous, causing nausea and vomiting. **Looks like a cherry tomato.** It is occasionally fatal, especially to children.
- Lilies **Worldwide** There are some 3500 species that comprise the lily (Lilaceae) family. Some are beneficial including (foods such as onion, shallot, garlic, chives [all *Allium* spp] and asparagus) and some with medicinal uses (colchicine and red squill) Many produce alkalids which are poisonous, especially to cats.
- Manchineel (*Hippomane mancinella*) **Native to the Caribbean (including Puerto Rico and the Virgin Islands).** It is one of the most poisonous trees in the world All parts of this tree including the fruit contain toxic phorbol esters typical of the Euphorbiacea. Sap may cause burning of the skin and smoke from burning may cause eye irritation and blindness. Fruits, which are similar in appearance to an apple, are green or greenish-yellow when ripe.
- Oak Worldwide Most species foliage and acorns are mildly poisonous, causing digestive upset, heart trouble, contact dermatitis. Rarely fatal.

- Poison-ivy (*Toxicodendron radicans*), Poison-oak (*T. diversilobum*), and Poison Sumac (*T. vernix*) **North America** All parts of these plants contain a highly irritating oil with urushiol (this is actually not a poison but an allergen). Skin reactions can include blisters and rashes. It spreads readily to clothes and back again, and has a very long life. Infections can follow scratching.
- Pokeweed (*Phytolacca sp.*) **Native to North America.** Leaves, berries and roots contain phytolaccatoxin and phytolaccigenin - toxin in young leaves is reduced with each boiling and draining.

## **FLD 46 CONTROL OF EXPOSURE TO LEAD**

### **REFERENCES**

29 CFR 1926.62

### **RELATED FLDs AND PROGRAMS:**

*Occupational Medical Monitoring Program*

*Personal Protective Equipment Program*

*Respiratory Protection Program*

This FLD provides guidelines for controlling exposure to lead in the workplace. This WESTON-specific instruction applies corporate-wide and may require consultation and interpretation by a Certified Industrial Hygienist for unique applications.

Managers shall ensure employees are properly trained in the provisions of the standard prior to performing activities involving exposure to lead or lead compounds.

### **INTRODUCTION**

Based upon limited differences in compliance requirements between the General Industry and the Construction Industry Standards WESTON policy is to follow compliance requirements as determined in 29 CFR 1926.62, "Lead Exposure in Construction" for all activities which involve occupational exposure to lead. The forms of lead to which the standard applies is defined to include metallic lead, all inorganic lead compounds, and organic lead soaps.

This practice applies to occupational exposure to lead at or above the Action Level (AL). Specific requirements for medical monitoring, respiratory protection, hygiene facilities, etc. are not mandated until exposure reaches the AL or the Permissible Exposure Level (PEL).

The lead standard includes requirements addressing exposure assessment, methods of compliance, respiratory protection, protective clothing and equipment, hygiene facilities and practices, medical surveillance, medical removal protection, employee information and training, signs, recordkeeping, and observation of monitoring.

The lead standard lists specific tasks which require conformance with the most restrictive portions of the standard until monitoring indicates otherwise. The tasks include; abrasive blasting, welding, cutting and burning of steel or structures containing or coated with lead or lead products.

### **Permissible Exposure Level (PEL) and Action Level (AL)**

For both the general industry and the construction industry, the PEL for lead exposure is 50 $\mu$ g/m<sup>3</sup> and the AL is 30 $\mu$ g/m<sup>3</sup>.

For exposures greater than an 8-hour day, the time-weighted average (TWA) for that day must be reduced according to the formula:

- Allowable employee exposure (in  $\mu$ g/m<sup>3</sup>) = 400 divided by the hours worked that day.

## **Potential Sources of Exposure**

For WESTON operations, potential sources of exposure include, but are not limited to; industrial hygiene surveys, wet-process paint chip sampling, and drilling operations where lead is present as a contaminant.

In addition, certain "Trigger Tasks" such as; welding and cutting on lead paint or lead-contaminated structures, dry sanding or scraping, soldering and pipe-fitting operations involving lead-containing materials and dry cleanup of lead contaminated surfaces are potential exposure operations. Specific monitoring and protection requirements follow.

## **Exposure Assessment and Initial Requirements**

Each task conducted by WESTON personnel must be evaluated as to the potential for exposure to lead. In accordance with the standard, exposure is that which would occur regardless of the use of respiratory protection. Therefore, any concentration must be evaluated as to the potential for employee exposure at or above the AL.

## **Hygiene Surveys and Sampling Tasks**

Previous data less than 12 months old may be used as the initial exposure assessment in order to determine appropriate levels of protection. This data must have been collected under workplace and environmental conditions closely resembling current task activities.

Defensible data from previous soil sampling efforts may be utilized for determining preliminary levels of protection, by inserting soils concentration data into the action levels formula. Refer to the Corporate Environmental Health and Safety Portal Site under "Technical Resources" for guidance on calculating Action Levels. Personal air sampling must still be performed in order to verify exposure until and/or unless comprehensive background data (reviewed by an industrial hygienist) are available to justify omitting personal sampling.

Other objective data may be utilized in lieu of initial monitoring provided the objective data is documented and appropriate for the materials and work processes/activities conducted.

## **Trigger Tasks**

Until such time as an exposure assessment (either through personal air sample results or approved and documented historic data) has been conducted which indicates actual exposures, the following task-specific guidelines are applicable.

- Where lead-containing coatings or paint are present: Manual demolition of structures (e.g., dry wall), manual scraping, manual sanding, heat gun applications, and power tool cleaning with dust collection systems; and/or spray painting with lead paint. It will be presumed that the level of lead in the air is above the PEL but, below 500  $\mu\text{g}/\text{m}^3$ . The minimum respiratory protection for these activities is a properly fitted half-face respirator with N, R, or P100 filter cartridges. Respirators providing higher levels of protection may be used and an employee has the right to request a powered air-purifying respirator (PAPR) with N, R, or P100 Cartridges.
- Where activities involve using lead-containing mortar; lead burning where lead-containing coatings or paint are present: rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal, it will be presumed that the level of lead in the air is above the 500  $\mu\text{g}/\text{m}^3$  but below 1250  $\mu\text{g}/\text{m}^3$ . The minimum respiratory protection for these activities is a loose-

fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode). A Quantitative Fit Test is required for use of respiratory protection for these activities. Respirators providing higher levels of protection may be used. For WESTON personnel the minimum respiratory protection is a tight fitting full face respirator with N, R, or P100 filter cartridges unless an exception is approved by a WESTON Certified Industrial Hygienist.

**Note:** An employee has the right to request a PAPR with N, R, or P 100 Cartridges.

- Where activities involve: Abrasive blasting, welding, cutting, or torch burning, the respiratory protection required is any supplied air respirator operated in positive pressure mode.
- For any activity where it is reasonably believed that exposure over the PEL will result, the respiratory protection is: Half- or Full-Face air purifying respirator (APR) with appropriate high efficiency filters; PAPRs with appropriate cartridges; or Supplied Air Respirators. Actual selection is dependent upon the potential for exposure.

Until the employee exposure assessment (personnel monitoring or approved historic data) has been performed and actual employee exposure has been determined, all employees performing the tasks described in the paragraphs above in this section must be supplied with interim protection as follows:

- Appropriate respiratory protection.
- Appropriate personal protective clothing and equipment.
- Change areas.
- Hand washing facilities.
- Biological monitoring.
- Training.

## **Monitoring**

### **Initial Monitoring Requirements**

The exposure assessment results will be used to determine whether any employee is being exposed to lead at or above the action level of  $30\mu\text{g}/\text{m}^3$ .

With the exception of allowances described below, monitoring for worker exposure requires collection of personal air samples which are representative of a full shift for each task involving known or potential exposure and any of the following, relevant considerations:

- Any information, observations, or calculations which would indicate employee exposure to lead;
- Any previous measurements of airborne lead; and
- Any employee complaints of symptoms which may be attributable to exposure to lead.

**Note:** Monitoring for the initial determination, where performed, may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

## **Historical Data**

Where WESTON has previously monitored for lead exposures, such earlier monitoring results may be used to satisfy the requirements of initial monitoring and monitoring frequency, if the sampling and analytical methods meet the accuracy and confidence levels as indicated in paragraph of 29 CFR

1926.62(d)(9). Additionally, the data must have been obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the current operations.

### **Objective Data**

Where objective data demonstrates that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the AL during processing, use, or handling, such data may be relied upon instead of performing initial monitoring.

An accurate record documenting the nature and relevancy of objective data used in assessing employee exposure in lieu of exposure monitoring, must be maintained.

**Exception:** Objective data, as described above, is not permitted to be used for exposure assessment in connection with the specific activities previously discussed as "Trigger Tasks".

### **Positive Initial Determination and Initial Monitoring**

Where a determination shows the possibility of any employee exposure at or above the AL, monitoring must be conducted which is representative of the exposure for each employee in the workplace who is exposed to lead.

### **Negative Initial Determination**

Where a determination is made that no employee is exposed to airborne concentrations of lead at or above the AL a written record of such determination must be made.

### **Frequency**

If the initial determination reveals employee exposure to be below the AL, further exposure determination need not be repeated except as otherwise provided in the last paragraph of this section.

If the initial determination or subsequent determination reveals employee exposure to be at or above the AL, but at or below the PEL monitoring must be conducted at least every 6 months.

If the initial determination reveals that employee exposure is above the PEL, monitoring must be performed quarterly.

Whenever there has been a change of equipment, process, control, or personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the AL or may result in employees already exposed at or above the AL being exposed above the PEL, additional monitoring must be conducted in accordance with this practice.

### **Employee Notification**

Each employee shall be notified in writing of the results which represent that employee's exposure within five working days after completion of the exposure assessment.

Whenever the results indicate that the representative employee exposure, without regard to respirators, is at or above the PEL a written notice is required stating that the employee's exposure was at or above that

level and includes a description of the corrective action taken or to be taken to reduce exposure to below that level.

Exposure monitoring records must be maintained as required in 29 CFR 1926.62(n)(1). Minimum information includes:

- Sampling data and procedures utilized.
- Description of sampling and analytical methods used.
- Type of respiratory protection used.
- Name, social security number, job classification for specific persons monitored and/or representative groups.
- Any environmental variables which could impact measurements.

### **Engineering Controls**

As in all cases of potential or known exposure to a hazardous environment, engineering controls are to be evaluated as to effectiveness and appropriateness under the site-specific circumstances. Controls must be listed in the site-specific Health and Safety Plan (HASP) and implemented as appropriate or feasible. Appropriate engineering controls include dust suppression, use of longer torches in cutting operations, use of mechanical shears in lieu of torches, vacuum blasting methods, and local ventilation.

### **Ventilation**

When mechanical ventilation is used to control lead exposure, the mechanical performance of the system must be evaluated and documented as to its effectiveness in controlling exposure.

### **Work Practice Controls**

WESTON will not use administrative controls such as worker rotation as a means of reducing employees' TWA exposure to lead unless expressly approved by a qualified safety professional.

### **General Housekeeping**

All surfaces shall be maintained as free as practicable of accumulations of lead.

Floors and other surfaces where lead accumulates shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.

Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found ineffective.

Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.

Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

## **Hygiene Facilities and Practices**

In control zone areas where employees are exposed to lead above the PEL without regard to the use of respirators, food or beverage shall not be present or consumed, tobacco products shall not be present or used, and cosmetics shall not be applied.

Clean change areas shall be provided for employees whose airborne exposure to lead is above the PEL, without regard to the use of respirators.

To prevent cross-contamination, change areas, as needed, shall be equipped with separate storage facilities for protective work clothing and equipment and for street clothes.

Employees exposed to lead concentrations greater than the AL shall not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

Shower facilities shall be provided, where feasible, for use by employees whose airborne exposure to lead is above the PEL. Adequate supplies, cleansing agents, and towels shall be provided.

Lunchroom facilities or eating areas shall be as free as practicable from lead contamination and readily accessible to employees.

Employees whose airborne exposure to lead is above the PEL, without regard to the use of a respirator, must wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

Employees shall not enter lunchroom facilities or eating areas with protective work clothing or equipment which has been contaminated by surface lead dust in concentrations exceeding the AL.

Adequate hand washing facilities shall be provided for use by employees exposed to lead in concentrations exceeding the AL. These facilities must be designed in accordance with 29 CFR 1926.51(f). Where showers are not provided, employees must wash their hands and face at the end of the work-shift.

**Note:** Short-term (less than one week) field activities may utilize appropriate personal decontamination sequences such as those allowed under 29 CFR 1910.120 (HAZWOPER) in lieu of contained clean rooms, showers and change facilities.

## **Personal Protective Clothing and Equipment**

Where exposures to lead above the AL (without regard to the use of respirators) have been validated by monitoring or where employees are exposed to lead compounds which may cause skin or eye irritation (e.g. lead arsenate, lead azide), and as interim protection for employees performing tasks as specified as “Trigger Tasks”, affected employees must use appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments such as, but not limited to:

- Coveralls or similar full-body work clothing;
- Gloves, hats, and shoes or disposable shoe coverlets; and
- Face shields, vented goggles, or other appropriate protective equipment as necessary.
- Change areas in accordance with 29 CFR 1926.62(i)(2).
- Hand washing facilities in accordance with 29 CFR 1926.62(i)(5).

- Biological monitoring in accordance with 29 CFR 1926.62(j)(1)(i), to consist of blood sampling and analysis for lead and zinc protoporphyrin levels, and;
- Training as required under 29 CFR 1926.62(l)(1)(i) regarding 29 CFR 1926.59, Hazard Communication; training as required under 29 CFR 1926.62(l)(2)(ii)(C), regarding use of respirators; and training in accordance with 29 CFR 1926.21, Safety training and education.

The HASPs and fixed facility operating procedures must list specific and appropriate PPE that will be utilized for each task involving known or potential exposure to lead or lead compounds.

PPE utilized will be disposable garments. Personnel in maintenance or fixed operations may use re-useable garments only under the direction and approval of a qualified safety professional.

Garments will be disposed of at the end of a shift or upon leaving a controlled zone whichever comes first. Under no conditions will any employee be allowed to take contaminated garments with the employee to his or her home.

Proper decontamination of re-usable equipment/PPE must be conducted prior to allowing these materials to leave the site.

Contaminated protective clothing which is to be cleaned, laundered, or disposed of, must be placed in a closed container in the change area which prevents dispersion of lead outside the container.

Containers of contaminated (defined as when exposures are greater than or equal to the PEL) protective clothing and equipment must be labeled as follows:

"Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations."

The removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air shall be prohibited.

## **Respirators**

For WESTON operations, respirators shall be used in accordance with WESTON's Respiratory Protection Program in the following circumstances:

- Whenever an employee's exposure to lead exceeds the AL;
- In work situations in which engineering controls and work practices are not sufficient to reduce exposures to or below the AL;
- Whenever an employee requests a respirator; and
- As interim protection for employees performing "Trigger-tasks".

Respirators approved for use are limited to:

- Properly fitted half-face APRs with high-efficiency filters for concentrations not exceeding 500µg/m<sup>3</sup>.

- A loose fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode for concentrations not to exceed 1250  $\mu\text{g}/\text{m}^3$ ).
- Properly fitted full-face APRs with high efficiency filters for concentrations not in excess of 2,500  $\mu\text{g}/\text{m}^3$ .
- Tight fitting full-facepiece PAPRs with high-efficiency filters for concentrations not in excess of 2,500  $\mu\text{g}/\text{m}^3$ .
- Full-facepiece, positive-pressure supplied air respirators (SARs) for concentrations not in excess of 100,000  $\mu\text{g}/\text{m}^3$ .
- Full-facepiece self-contained breathing apparatus (SCBA) for concentrations greater than 100,000  $\mu\text{g}/\text{m}^3$  or for unknown concentrations.

Respirators specified for higher concentrations can be used at lower concentrations of lead.

A full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

Fit-testing must be conducted in accordance with WESTON's Respiratory Protection Program and 29 CFR 1910.134.

### **Signs and Labels**

The following warning signs shall be posted in each work area where exposure to lead is above the PEL.

WARNING

LEAD WORK AREA

POISON

NO SMOKING OR EATING

Signs required by this paragraph must be illuminated and cleaned as necessary so that the legend is readily visible from all areas of approach to the work area.

### **Medical Surveillance**

Initial medical surveillance in the form of blood testing shall be made available to employees occupationally exposed on any day to lead at or above the AL.

Biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels will be performed during initial medical surveillance and must be performed on the following schedule:

- For any employee anticipating work at a site or operation where the known or potential exposure (without regard to the use of respiratory equipment) equals or exceeds the AL, biological monitoring must be conducted prior to the start of that person's work on site or within 48 hours of such determination. Post-site work monitoring must be conducted within one week of that person's completion of site work. NOTE: This initial determination and need for blood testing should be reviewed by a Certified Industrial Hygienist; particularly if a negative determination is made. Appropriate documentation must be placed in the site files for future reference.

- During long-term (greater than 30 days) site activities for each employee with known or potential exposure to or greater than the AL for 30 or more days per year, at least every 2 months for the first 6 months and every 6 months thereafter.

Within 5 working days after the receipt of biological monitoring results, WESTON's medical consultant will notify each employee in writing of his or her blood lead level. The content of and review mechanisms for medical examinations made available shall be pursuant to 29 CFR 1926.62(j).

For any employee found to have a blood lead level at or above 40µg/100g of whole blood, testing will be performed every 2 months until two consecutive blood samples and analysis indicate a blood lead level below 40µg/100g of whole blood.

### **Medical Removal and Protection**

WESTON will temporarily remove an employee from work having an exposure to lead at or above the AL on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to 29 CFR 1926.62(k) indicate that the employee's blood lead level is at or above 50 µg/dl.

WESTON will remove an employee from work having an exposure to lead at or above the AL on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

**Note:** Medical removal protections shall be strictly as interpreted under 29 CFR 1926.62(k) and other applicable Acts or Standards.

In the event any employee must be removed from work activities due to blood lead levels records and documents must be maintained in the project files as required in 29 CFR 1910.1025(n) or 1926.62(n).

### **Education and Training**

All WESTON personnel with potential occupational exposure to lead will be provided with training, initially and annually thereafter, as to:

- Content of the standards 29 CFR 1910.1025 and 1926.62.
- The nature of operations which could result in exposure at or above the action level on any one day.
- Respirator use, selection and maintenance.
- Medical surveillance and medical removal requirements and protections.
- Health effects of lead.
- Engineering and work practice controls.
- WESTON's Lead Exposure Compliance Program and associated site specific plans.

### **Recordkeeping and Training**

Documentation of training records in the form of training materials and attendance sheets will be maintained in the project files.

## **Exposure Assessments**

Monitoring and data sheets used to determine employee exposures must be maintained on all sites with lead exposure. As required under 29 CFR 1910.20, copies of all documentation must be maintained in the project files.

Exposure assessment and monitoring records must include:

- The date(s), number, location and results of samples taken.
- The determination that the sampling procedures are representative of employee exposure.
- A description of the sampling and analytical procedures used.
- The type of respiratory protection used, if any.
- The name, employee number, and job classification of the employee(s) monitored.
- Environmental conditions encountered.

Objective data which is or will be used for determining exemption from initial monitoring as allowed under 29 CFR 1926.62(d)(3) must be maintained in the project files. Objective data utilized is required to be maintained for a period of at least 30 years.

## **Medical Surveillance**

Medical surveillance will be conducted and records will be maintained in accordance with WESTON's Occupational Medical Monitoring Program requirements as indicated in 29 CFR 1910.1025(n) and/or 1026.62(n).

## **Task Specific Methods of Control**

Based upon WESTON policy, each site activity involving potential exposure to lead must be identified and analyzed through a Task/Risk Analysis as a part of the site-specific HASP. This Task/Risk Analysis must identify methods, materials and equipment utilized in limiting exposure. Appendix 1 provides Actions/Requirements Based on Task. Appendix 2 provides a Task/Risk Analysis Inspection Checklist.

Current HASP forms can be obtained through the Division Environmental Health and Safety Manager, Corporate Environmental Health and Safety or on the WESTON EHS Portal Site.

## **Hazard Communication and Multi-Employer Sites**

On multi-employer sites where the activities of one contractor/employer will or may have a direct impact with potential exposure to other contractors/employers, the Site Manager is responsible for contacting a representative of the potentially affected parties. The Site Manager will inform them of the lead exposure potential, control methods utilized, protective procedures to be followed, and the limits of lead contamination as known.

## **Inspections and Audits**

The Project Manager is responsible for providing (at a minimum) weekly documented inspections of the work site. In accordance with the requirements of the lead standard these inspections must encompass all areas of the site where exposure to lead is at or above the PEL (Appendix 2). Additionally, any equipment, PPE, signs, and decontamination or disposal operations must be evaluated as to compliance with the standard and WESTON Policy regardless of the exposure concentration. Any non-compliance must be noted and corrected.

## **APPENDIX 1**

### **ACTIONS/REQUIREMENTS BASED UPON TASK:**

**1. Exposure Less than Action Level (AL):**

- Initial Exposure Assessment
- Hand Washing Facilities
- Proper Housekeeping
- Medical Removal Protection

**2. Exposure at or over AL but less than Permissible Exposure Limit (PEL):**

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Medical Removal Protection

**3. Exposure at or over AL but less than the PEL (30 or more days/year):**

- As above and
- Medical Examinations and Recordkeeping

**4. Exposure at or greater than the PEL:**

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Appropriate Respiratory Protection
- Warning Signs
- Proper PPE
- Proper Change Areas
- Decontamination Facilities/Shower as feasible
- Separate Eating Areas
- Medical Examinations and Recordkeeping
- Medical Removal Protection

**5. Exposure to Trigger Tasks (until exposure is verified):**

- See requirements under greater than PEL exposure

**APPENDIX 2**  
**TASK/RISK ANALYSIS AND INSPECTION CHECKLIST**  
**FOR ACTIVITIES WITH POTENTIAL FOR LEAD EXPOSURE**

This task involves the known or potential risk of exposure to lead or lead-containing materials. As such, requirements as indicated in 29 CFR 1910.1025 or 29 CFR 1926.62 and WESTON's Written Lead Exposure Compliance Program (FLD 46) will be followed.

**Task Description:**


**Equipment Required/Used:**


**Training Required/Used:**


**Initial Exposure Determination: (Indicate Method[s] Used)**

	Personal Sampling
	Objective Data (attach or indicate location of data)
	Historical Data (attach or indicate location of data)

**PPE Includes:**

	Respiratory Protection (specify)		Shoes or Shoe Covers (specify)
	Coveralls (disposable)		Face Shield, Goggles or Safety Glasses (specify)
	Coveralls (reusable)		Other (specify)
	Gloves (specify)		
	Head Covering (specify)		

**Inspection Items:**

Y/N	Item/Action
	Personnel are wearing appropriate PPE.
	PPE is in good condition.
	PPE is removed and disposed of in a manner to preclude airborne release of lead or lead compounds.
	Will clothing be laundered?
	If yes, then ensure notification of vendor as required.
	Will clothing be disposed of?
	If yes, container of disposable clothing and contaminated materials is closed and appropriately labeled.
	All surfaces are maintained (as practicable) free of lead or lead compounds.
	Appropriate methods and procedures are used for cleanup of surfaces with lead contamination.
	If vacuum is utilized, it is equipped with appropriate HEPA filter.
	If exposure is known or suspect to be at or greater than the PEL, then:
	There is no eating, drinking, cosmetic application, or tobacco consumption in contaminated areas.
	Change areas are available.
	Change areas are maintained to prevent cross-contamination of work and street clothing.
	No work clothing which has been known or is potentially contaminated is allowed to be worn off-site or in on-site clean areas.
	Clean, sanitary showers (where feasible) are maintained.
	All personnel shower prior to leaving the site at end of shift.
	Clean, sanitary eating areas are provided.
	Hand washing facilities are provided in all cases.
	Personnel are required to wash hands and face upon leaving the contaminated area.

**Comments:**

## FLD 61      GASOLINE CONTAMINANT EXPOSURES

### RELATED FLDs

*FLD54 – Benzene Exposure Control Plan*

Gasoline produced in the United States can contain up to 5% benzene by volume, therefore, if gasoline contamination is a concern, there may be the potential for benzene to be present in the breathing zone at concentrations reaching or exceeding the OSHA Permissible Exposure Level (PEL) of 1 ppm or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 0.5 ppm. A determination of the magnitude of worker exposure must be made to allow use of this guideline and of the applicability of the gasoline TLV/Time Weighted Average (TWA) or establish the need to follow the OSHA Benzene exposure requirements (29 CFR 1910.1028 and FLD 54).

**Actions for this guide are based upon the ACGIH TLV/TWA for Gasoline of 300 ppm.**

The “units” as measured by a photo ionization detector (PID) or flame ionization detector (FID) can be paired with Levels of Protection (LOP) as long as the benzene concentration is less than 0.5 ppm.

0-10 units\* = Level D  
10-150 units\* = Level D  
150-300 units\* = Level C  
300 units or greater\* = Level B

### Monitoring Requirements

A properly calibrated PID or FID must be used to monitor total organic vapor exposure. However, at 10 units\* or higher, site personnel must evaluate the potential for benzene-specific exposure.

To quantify benzene exposure, the RAE Systems UltraRAE with the RAE-SEP benzene tubes (see RAE Systems Guide TN-127) is the PID of choice as cross-sensitivities are eliminated or greatly minimized. The LOP identified above may be used provided benzene exposures remain below 0.5 ppm.

An alternative, but less accurate procedure using colorimetric chemical detector tubes (Draeger benzene0.5/c or equivalent tube) may be used to quantify benzene concentration. If less than 0.5 ppm, continue with the LOP referenced.

RAE-SEP tube or colorimetric tube readings must be made and documented at 60 minute (maximum) intervals during potential exposure situations when the PID/FID readings are 10 units or greater.

All air monitoring needs to be conducted within the employee’s breathing zone

**If benzene exposures are equal to, or greater than 0.5 ppm, compliance with FLD 54 and OSHA's Benzene standard (29 CFR 1910.1028) is required.**

For Level C operations, a full-face air-purifying respirator must be used. Cartridges must be changed at the end of service life (indicator) or used for no longer than 4-hour work periods.

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**APPENDIX G**  
**SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM – FORM 28**

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## SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM-FORM 28

### ***Location-Specific Hazard Communication Program/Checklist***

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

- ☐ Site or other location name/address: New York City Smelter Sites
- ☐ Site/Project/Location Manager: Denise Breen
- ☐ Site/Location Safety Officer: Scott Snyder/Michele Capriglione
- ☐ List of chemicals compiled, format: ☒ HASP ☐ Other: \_\_\_\_\_
- ☐ Location of MSDS files: HASP
- ☐ Training conducted by: Name: SHSO – Scott Snyder Date: \_\_\_\_\_
- ☐ Indicate format of training documentation: ☒ Field Log: ☐ Other: \_\_\_\_\_
- ☐ Client briefing conducted regarding hazard communication: N/A
- ☐ If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies:  
N/A
- ☐ Other employer(s) notified of chemicals, labeling, and MSDS information: N/A
- ☐ Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary? ☐ Yes ☐ No N/A

### ***List of Hazardous Chemicals***

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

### ***Container Labeling***

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled.

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

### ***Material Safety Data Sheets (MSDSs)***

#### **FORM 28**

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and

will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

### ***Employee Training and Information***

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

### ***Hazardous Nonroutine Tasks***

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

### ***Chemicals in Unlabeled Pipes***

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

### ***Multi-Employer Work Sites***

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary. The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.

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**APPENDIX H**  
**FIELD AUDIT CHECKLIST**  
**EAST DIVISION - EPA**

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## FIELD AUDIT CHECKLIST EAST DIVISION – EPA

**Site Name and Location:** \_\_\_\_\_

**TDD No.:** \_\_\_\_\_

**Site Project Manager:** \_\_\_\_\_

**Date:** \_\_\_\_\_

### 1) Site Health and Safety

- \_\_\_\_\_ HASP has been approved, is current, and available (in plain view).
- \_\_\_\_\_ All site tasks being conducted have been addressed in the HASP.
- \_\_\_\_\_ Field Safety Officer (FSO) has been designated and is present.
- \_\_\_\_\_ All field team members and subcontractors have signed HASP.
- \_\_\_\_\_ Tailgate safety meeting has been conducted and documented by Site/Project Leader.
- \_\_\_\_\_ Field team members are aware of health and safety concerns and action levels.
- \_\_\_\_\_ Air monitoring instruments, as specified in the HASP, are available and have been calibrated.
- \_\_\_\_\_ Calibration information and background levels have been documented in a Logbook or in Field Data Sheets.
- \_\_\_\_\_ Work zones (clean zone, contamination reduction corridor, exclusion zone) (if applicable) are known by field team members.
- \_\_\_\_\_ Field team members and subcontractors are conducting activities in a safe and appropriate manner.
- \_\_\_\_\_ Any changes to the HASP have been verbally approved (at a minimum) by the RST 2 HSO or Alt. HSO.
- \_\_\_\_\_ Environmental Compliance items have been addressed:
  - \_\_\_\_\_ DigSafe/Call-Before-U-Dig (if necessary).
  - \_\_\_\_\_ Radiation Licensing for sealed radiation source field instruments (XRF, APD 2000, etc. - if necessary).
  - \_\_\_\_\_ MSDS for all materials brought on site by RST 2 are available.
  - \_\_\_\_\_ MSDS for all materials brought on site by subcontractors are available.

### 2) Pre-Sampling Activities

- \_\_\_\_\_ Relevant WESTON SOPs are available.
- \_\_\_\_\_ UFP Quality Assurance and Project Plan (QAPP) has been completed and signed by the Contracting Officer's Representative (COR).
- \_\_\_\_\_ Appropriate contacts (local police and fire departments, hospital, abutters, neighbors, etc.) have been notified (if necessary).
- \_\_\_\_\_ Relevant RST 2 Field Data Sheets are available.
- \_\_\_\_\_ Logbook is available and is maintained by Site Project Manager.
- \_\_\_\_\_ Decontamination area is established in an appropriate manner and location.
- \_\_\_\_\_ Non-dedicated sampling equipment has been decontaminated prior to use.
- \_\_\_\_\_ FORMS II Lite or SCRIBE pre-sampling tasks have been completed.
- \_\_\_\_\_ Laptop computers have been tested with field printers.
- \_\_\_\_\_ QC samples (Rinsate Blanks, Trip Blanks, etc.) are scheduled to be collected.
- \_\_\_\_\_ Sustainability Coordinator has been assigned.

\_\_\_\_\_ Local FedEx facilities have been identified.  
\_\_\_\_\_ Disposal of IDW has been discussed with EPA.  
\_\_\_\_\_ The need for Dangerous Goods Shipping has been identified and prepared for.

**3) Sampling Activities**

\_\_\_\_\_ Field sampling team is using appropriate PPE as specified in the HASP.  
\_\_\_\_\_ Field sampling team is using appropriate air monitoring instruments.  
\_\_\_\_\_ Field sampling team is using appropriate sampling equipment.  
\_\_\_\_\_ Field sampling team has copy of the QAPP (or Worksheet #19 from the UFP QAPP).  
\_\_\_\_\_ Samples are collected in accordance with appropriate SOP(s).  
\_\_\_\_\_ Samples have been preserved in accordance with appropriate SOP(s).  
\_\_\_\_\_ Liquid samples have been tested with pH paper following preservation.  
\_\_\_\_\_ QC Samples (Rinsate Blanks, Trip Blanks, and temperature blanks; and Duplicates, Replicates, MS/MSD, etc.) have been collected.  
\_\_\_\_\_ Chain-of-Custody is maintained for samples.  
\_\_\_\_\_ Sample container's exteriors are cleaned prior to placing labels.  
\_\_\_\_\_ Samples are placed in plastic re-sealable bags.  
\_\_\_\_\_ Cardboard boxes, plastic containers, etc. have been separated and placed in containers for recycling.

**4) Shipping (Environmental Samples)**

\_\_\_\_\_ Samples have been QA/QC before being placed in a cooler for shipment.  
\_\_\_\_\_ Holding times have been met.  
\_\_\_\_\_ Chain of Custody Record, Cooler Return Form, and Notice to Laboratory personnel are signed and in every cooler.  
\_\_\_\_\_ RST 2 has retained copies of COC.  
\_\_\_\_\_ Samples are shipped following WESTON and IATA Guidance.  
\_\_\_\_\_ Sufficient Ice and Absorbent Material is Used. Ice is Double Bagged.

**5) Shipping (Hazardous Samples)**

\_\_\_\_\_ All of the requirements above have been met.  
\_\_\_\_\_ The sealed bag has been placed inside an appropriately sized metal can with enough non-combustible absorbent packaging material, such as vermiculite, to prevent potential breakage and leakage, and to provide for absorption of liquid.  
\_\_\_\_\_ Ice packs have been placed on top of the samples inside the cans to keep the samples cool during shipment.  
\_\_\_\_\_ The metal cans have been placed in a DOT-approved cardboard boxes or steel cans.  
\_\_\_\_\_ The cardboard boxes have been sealed with tape.  
\_\_\_\_\_ The appropriate labels and identification, as specified by the IATA dangerous goods regulations, have been placed on the cardboard boxes to indicate that the contents may be hazardous.

## 6) Post-Sampling Activities

- \_\_\_\_\_ Investigative Derived Waste (IDW) has been properly containerized, labeled, and secured.
- \_\_\_\_\_ Investigative Derived Waste (IDW) checklist has been used.
- \_\_\_\_\_ Source of materials (IDW) in each drum has been documented in the Logbook.
- \_\_\_\_\_ Staged drums of IDW have been photographed.
- \_\_\_\_\_ Sample locations have been marked using a Global Positioning System (GPS) unit.

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**Comments:**

**Corrective Actions:**

**Auditor:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**QAO Review:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

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**APPENDIX I**  
**REGION 2 SITE ASSESSMENT TEAM TO-14**  
**ENVIRONMENTAL SAMPLE SHIPMENT CHECKLIST**

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**REGION 2 SITE ASSESSMENT TEAM TO-14**  
**ENVIRONMENTAL SAMPLE SHIPMENT CHECK LIST**

Check Box When Completed or N/A (for Not Applicable)

**Cooler**

- ☐ Cooler drain spout duct-taped closed on inside and outside, cooler is in good shape (no holes, not broken), **“UP” arrows on at least two opposing sides of cooler**, all old labels removed from cooler, any old writing crossed out with Sharpie, cooler has cooler number written on it.
- ☐ Cooler lined with trash bag, contains sufficient bubble wrap to provide cushioning for all samples (bubble wrap is above, below, and in between sample containers).
- ☐ Fresh ice in sufficient quantity in sealed plastic bags to provide sample preservation.

**Sample Containers**

- ☐ All 1-liter glass jars placed in sleeve-its or bubble wrap sleeves.
- ☐ All sample containers are properly labeled and placed in individual, sealed plastic bag.
- ☐ All sample containers for each sample location and particular analysis are in correct cooler, depending on analyses and laboratory destination.
- ☐ A properly labeled temperature blank is present in each cooler.
- ☐ Properly labeled rinsate/equipment blank samples are placed in correct cooler depending on analyses and laboratory destination.
- ☐ A properly labeled trip blank is in correct cooler (one trip blank per shipment for VOC analysis only, collected in the field prior to environmental aqueous sampling).

**Chain-Of-Custody (COC)**

- ☐ All samples are properly entered on correct COC form (including collection date/time and preservation information), depending on analyses and laboratory destination.
- ☐ The trip blank is properly entered on correct COC form.
- ☐ Rinsate/equipment blank samples are properly entered on correct COC form, depending on analyses and laboratory destination.
- ☐ Any other QA/QC samples (field duplicate/replicate, MS/MSD) are properly entered/indicated on correct COC form and placed in correct cooler, depending on analyses and laboratory destination. **Note: field duplicate/replicate samples should not be identified as such on the laboratory COC - should be entered as another sample.**
- ☐ COC form has Airbill number and site name on it.
- ☐ COC form signed by Sample Management Officer and Project Manager, custody relinquished to FedEx.

**Final Shipping Preparation**

- ☐ Correct COC form(s) ("Laboratory Copy" not the "Region Copy", all pages if multiple pages) are included in the appropriate cooler of each shipment.
- ☐ Notice to Lab Form and Cooler Return Form are included in each cooler of each.
- ☐ A return FedEx Airbill with correct W.O. No. is included in each daily shipment.

- ☐ Inner cooler liner trash bag is sealed, cooler itself is properly sealed close using strapping tape and COC seals.
- ☐ WESTON label with laboratory address on each cooler, covered with clear tape. Label links multiple cooler shipments (1/3, 2/3, 3/3, etc.).
- ☐ Federal Express Airbill is completed properly, including correct work order number.

**Site Name:** \_\_\_\_\_

**Checker (s) Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Notes:**


**Place Check List in Site File**

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**APPENDIX J**  
**WESTON SITE RISK ASSESSMENT FORM**

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## WESTON SITE RISK ASSESSMENT FORM

(To be completed by Corporate Security prior to submitting any proposal for work in a potentially violent area.)

### DESCRIPTION

**Site Name and Location:**

New York City Smelter Sites

**Customer Name and Location:**

Brooklyn and Bronx, NY

**Type of Work:**

Soil Sampling

**Projected Start Date:** 10/14/2014

**Projected Completion Date:** 11/21/2014

### DEMOGRAPHICS (Objective description of local geography, climate, population and related factors)

Low income neighborhoods

### THREAT INDICATORS (Subjective description of social, economic, political, criminal, terrorist and related factors)

High unemployment, idle population, shuttered businesses, delapidated housing and infrastructure, traffic

### COUNTERMEASURES (Current and projected risk mitigation factors)

**Friendly Military Forces:****Civilian Contractors/Private Security:****Liaison with local officials and leaders:****Other force protection requirements:**

Buddy system, awareness, cell phone, leave site before dark, secure valuables/do not leave equipment or vehicles unattended.

### OVERALL RISK ASSESSMENT AND SECURITY RECOMMENDATION

**Risk Level:**

☒ Medium

☐ High

☐ Extreme

Initials/Date

**Recommended Response to RFP:**

☐ Go

☐ No Go

**USE ATTACHMENTS FOR ADDITIONAL COMMENTS, MAPS AND DIAGRAMS**